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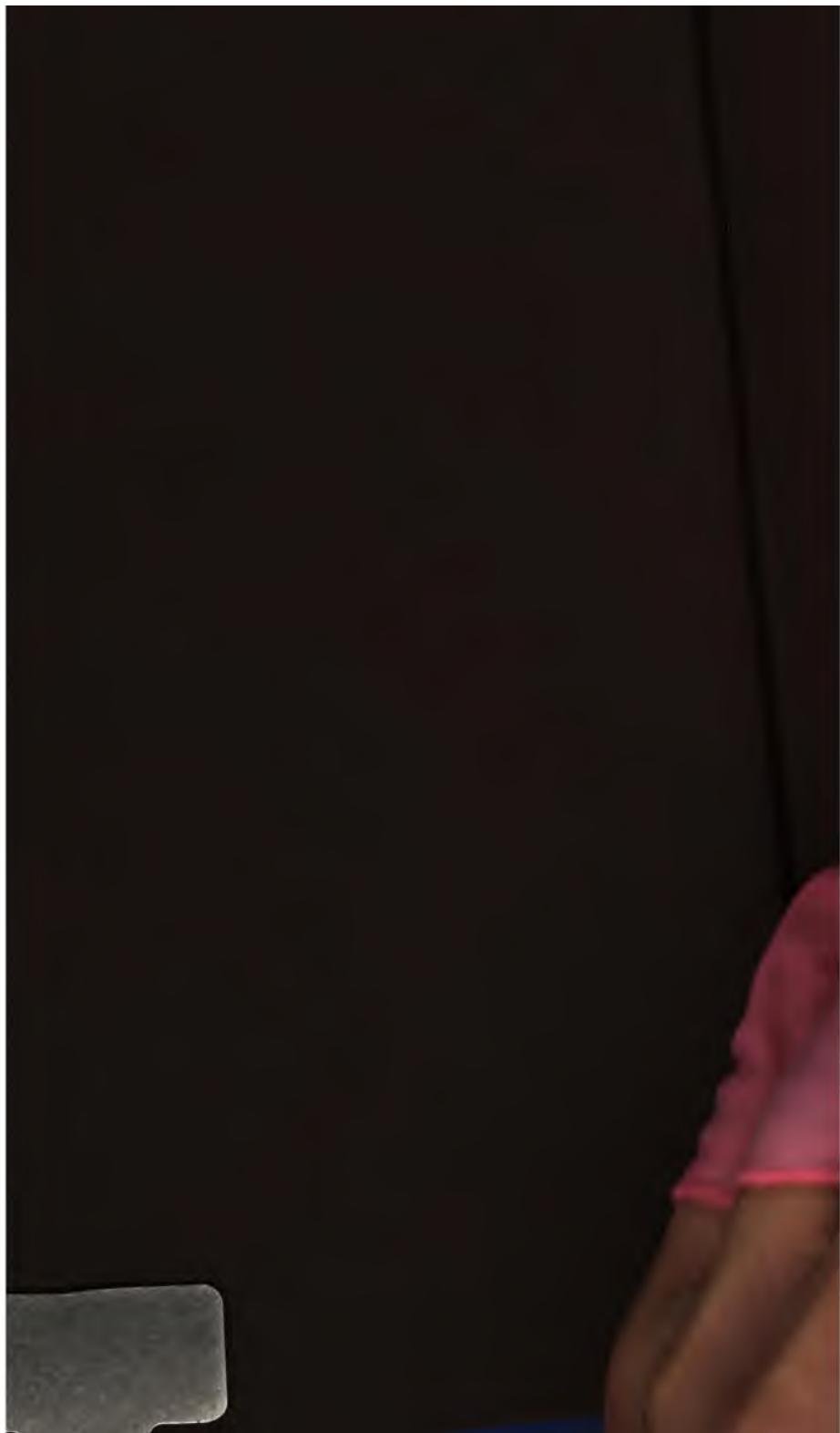
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C A M P A I G N 1870-1

*OPERATIONS OF THE GERMAN ENGINEERS
AND 'TECHNICAL TROOPS'*

*COL. G. GRAHAM
MAJ. C. N. MARTIN*





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OPERATIONS OF
THE GERMAN ENGINEERS
AND "TECHNICAL TROOPS"
DURING THE FRANCO-GERMAN WAR OF 1870-71.



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THE CAMPAIGN OF 1870-71.

OPERATIONS OF
THE GERMAN ENGINEERS
AND "TECHNICAL TROOPS"
DURING THE FRANCO-GERMAN WAR OF 1870-71.

PUBLISHED BY AUTHORITY,
AND IN ACCORDANCE WITH OFFICIAL DOCUMENTS,

By ADOLPH GOETZE,

CAPTAIN IN THE PRUSSIAN CORPS OF ENGINEERS, ATTACHED TO THE ENGINEER-COMMITTEE,
AND INSTRUCTOR AT THE MILITARY ACADEMY.

TRANSLATED FROM THE GERMAN,
BY COLONEL G. GRAHAM, V.C., C.B., R.E.

WITH SIX MAPS.



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THE OPERATIONS
OF
THE GERMAN ENGINEERS
AND 'TECHNICAL TROOPS.'*

INTRODUCTION.

ORGANIZATION OF THE GERMAN CORPS OF ENGINEERS
AND 'TECHNICAL TROOPS.'

THE Prussian Corps of Engineers in July 1870 consisted altogether of about 440 officers, some of whom were appointed to the Staff, Fortifications, Military Schools, etc., and some to service with the Pioneer battalions. On a general average each officer got a change of employment every three or four years.

The existing 12 Pioneer battalions were so organized, that each battalion in time of peace consisted of four companies, viz.:— 1 Pontoon-company, 2 Sapper-companies, and 1 Miner-company, in which the technical instruction was carried on with a view to their special duties, and accordingly the 1st company was principally exercised in forming military bridges, while the other three companies were especially instructed in siege-works, so that only a short time could be devoted to the general duties of Pioneers and Miners.

Besides these 12 Pioneer battalions a cadre was maintained on the peace establishment for the Torpedo detachment.

On the order to mobilize, the officers of the Engineer corps, as well as the Landwehr Pioneer officers, were distributed among

* There is no equivalent in the English service for *technische Truppen*. These troops are trained in technical Engineer duties, although incorporated with the battalions of the Guards, Line, and Landwehr.—(*Translator's Note.*)

2 Operations of the German Engineers and Technical Troops.

the different armies and bodies of troops, and those detachments of technical troops, which are given more in detail in the Appendix, were mobilized.

The Pioneer battalion of the Guards furnished 3 Field companies, besides the Reserve company, and together with No. 4 Pioneer battalion made up the 12 Telegraph divisions.

Each line battalion furnished 1 reserve company as well as 3 Field Pioneer and 3 Garrison Pioneer companies.

The ratio of the different sections in the service companies was arranged by the interchange of the men, so that in the Pontoon company there were 8 corporal's sections (*Korporalschäften*) of Pontoneers, 3 of Sappers and 1 of Miners; in the Sapper companies, 10 sections of Sappers, 1 of Pontoneers, and 1 of Miners. The garrison Pioneer companies were, as far as practicable, to be made up according to their special duties: thus the 1st (Pontoon) company was to have an establishment of 100 Pontoneers, 75 Sappers, and 25 Miners; the 2d (Sappers) company to have 175 Sappers and 25 Miners; finally, the 3d (Miners) company was to have 200 Miners. However, many changes had to be made.

The cadres of the garrison companies were principally supplied from No. 4 (Miners) company, which was broken up by the mobilization. The greater part of the men belonged to the Landwehr. The total establishment, exclusive of reserves, was as follows:—

- 36 Field Pioneer companies.
- 33 Garrison Pioneer companies.
- 7 Field-Telegraph detachments.
- 5 Etappen Field-Telegraph detachments.
- 5 Railway Field-Telegraph detachments.
- 1 Torpedo detachment.
- 1 Balloon detachment.
- 1 Field Photographic detachment.

General total, 89 companies and detachments, with

12 Pontoon columns.

12 Light field bridge-trains (Birago's materials).

12 Entrenching-tool trains.

Simultaneously with the mobilization, orders were issued for the immediate arming of the following coast fortresses:—

Stralsund, Swinemunde, Memel, Dantzig (including Neufuhr-

wasser and Weichselmunde), Pillau, the works at Rügen, Friedrichsort, Sonderburg, Düppel, the fortresses on the Elbe and mouth of the Weser, Wilhelmshaven.

The following inland fortresses were armed :—

Magdeburg, Minden, Wesel, Cologne, Coblenz, Mayence, Saarlouis, and Rastadt (conjointly with Baden). Preparations were also made for the eventual arming of the Silesian fortresses of Glatz and Neisse, but this was never fully completed.

As a great part of the officers doing duty on the fortifications had to be ordered off to the different staffs and newly formed bodies of troops, there remained behind in the fortresses only a small number of officers, who however zealously devoted themselves to duties which in a successful war could bring but small reward, but which would have been of the utmost importance had the tide of success swept in the other direction.

The Bavarian Engineer Corps.—The organization of the technical troops was so far different from the Prussian system, that the field Pioneers were, even in time of peace, completely separated from the garrison Pioneers.

The field Engineer regiment consisted, in peace-time, of 6 companies, whose education in field duties was throughout uniform. In time of mobilization it was composed (not counting 2 reserve companies) of 2 field Engineer divisions of 3 companies, of whom the two first were intended chiefly for the Pioneer service, and the third for the Pontoon service. The Pontoon companies had, however, a considerable deficiency in men, so that, as a rule, they had to apply for the assistance of the other companies in the construction of large bridges.

Moreover, the field Engineer regiment furnished 2 field Telegraph detachments and 1 Etappen Telegraph detachment, as well as a railway company.

The four garrison Engineer companies, which were distributed among the different fortresses in peace-time, were, at the beginning or during the course of the campaign, formed into 1 Etappen Engineer company, 1 independent garrison Engineer company, and 1 garrison Engineer division of 2 companies. Accordingly, exclusive of reserved troops, the total number mobilized were 14 companies and sections, with 6 sets of bridge equipment, 7 Pioneer and 3 Sapper and Miner equipments.

The distribution of the officers and detachments can be seen in

4 *Operations of the German Engineers and Technical Troops.*

the Appendix, and it only remains here to note that the Infantry Pioneers belonging to each Infantry regiment of a division might have been formed into companies, and could then, if required, have been employed on large technical works under the Engineer officers attached to the division.

All the Bavarian fortresses were armed at the beginning of the mobilization, viz., Ingoldstadt, Germersheim, Landau, and Ulm (the latter with aid of Würtemberg).

The Kingdom of Saxony possessed in peace-time 1 Pioneer battalion, which, in all important respects, was organized on the Prussian system, and which, at the mobilization, supplied 1 Reserve and 3 Field companies.

The Kingdom of Würtemberg furnished for the campaign, on mobilization, 2 field Pioneer companies, 1 garrison Engineer company, 1 field Telegraph detachment, and 1 Bridge-train (Birago's pattern).

The Grand Duchy of Baden (on the Prussian model), furnished $\frac{1}{2}$ Pontoon column (Kolonne), 1 Field Pioneer company, 1 garrison Pioneer company, 1 Light Field Bridge-train, and 1 Entrenching-tool column.

The Grand Duchy of Hesse furnished 1 Pioneer company, with Light Field Bridge-train.

There were thus, exclusive of reserves—

88 Field and Garrison Pioneer companies.

16 Telegraph detachments.

6 Railway detachments.

3 Special detachments.

Total available, 113

These were independent bodies of technical troops, with about 525 waggons, which, among other things, were loaded with material for about 4500 paces of bridge-way, with about 30,000 entrenching tools, and 585 miles (English*) of telegraph wires.

* 4½ English miles = 1 German mile nearly.

All distances given in this translation are to be understood as being English measurement.—(Translator's note.)

CHAPTER I.

OPERATIONS OF THE FIRST AND SECOND ARMIES UP TO THE PASSAGE ACROSS THE MOSELLE.

The First Army.

THE First Army formed the right wing of the German forces. At the commencement of the operations, this army consisted of the VII. and VIII. Army Corps, and the 3d Division of Cavalry. At the beginning of August it was reinforced by the I. Army Corps and the 1st Division of Cavalry.

The army had originally got orders to march on the line from Merzig to Saarlouis. The VII. Army Corps was to assemble on the 3d of August at Merzig and Beckingen, and the mass of the VIII. Corps in the neighbourhood of Saarlouis.

Both corps were to cross over to the left bank of the Saar with a portion of the troops. The fortress of Saarlouis was to have been completely armed and provided with a war-garrison of 6000 men, and would then have served as a point of support to the army, so that the latter would have been in a position to offer resistance even to very superior forces until the arrival of the Second Army.

The VII. Army Corps had crossed the Eifel mountains by forced marches, concentrating about Trier on the 31st July, so that the greater part of the Corps reached the position assigned to them on the Saar by the 3d of August. On this day the 1st Field Pioneer company constructed a bridge near Mettlach, which was used for crossing the river by a portion of the two divisions.

During the advance the VII. Corps had the whole course of the Moselle, from Coblenz to Trier, reconnoitred by the Engineer Staff, in order to be able to make preparations for such passages across the river as might become necessary.

6 *Operations of the German Engineers and Technical Troops.*

The 1st Field Pioneer company had got ready a bridge for the passage of the 14th Division of Infantry at Schweig (100 metres in length), out of improvised materials. A similar bridge was laid at Berncastel by the pioneers of the VII. Corps. The First Army had, however, in the meantime got orders not to cross the line from Saarburg to Wadern, and the army accordingly assembled on the 3d of August in the line from Wadern to Losheim, and on the same day portions of the Second Army reached Alzey. On the 4th of August the army took up the position from Lebach by Ottweiler to Tholey, and sent out strong reconnoitring parties to the front, past Saarlouis, on the roads to Thionville, Metz, and St. Avold.

As, however, in the meantime the road to St. Wendel, Ottweiler, and Neunkirchen was given up to the Second Army, the First concentrated N.W. of Saarbrück, and commenced their advance towards the line of the Saar on the 6th of August.

The VII. Army Corps got orders to advance on the Lebach road, and to push out advanced guards in the directions of Saarbrück and Volklingen, while the VIII. Corps moved on until west of Sulzbach. The 3d Division of Cavalry covered the right wing, and the I. Army Corps concentrated near Lebach.

The 14th Division of Infantry advancing on Saarbrück came about noon into collision with the retiring enemy, and moved therefore at once on to the attack. The enemy, however, brought up considerable reinforcements, and made a most obstinate resistance on the top of the Galgen-Hügel, so that the action came to a stand-still until the arrival of portions of the II. and III. Corps of the Second Army, when the enemy was forced to give up all his positions.

The 13th Division of Infantry had meantime, in accordance with orders from the General commanding the VII. Army Corps, crossed the Saar at Volklingen, where the massive bridge had been left intact, and had advanced against the strongly fortified position of the enemy, at the same time threatening his line of retreat.

At the approach of dark the conflict was broken off on the part of the 13th Division, who occupied Forbach on the following morning, and took possession of the abandoned camp of the French. At Forbach, besides a considerable amount of stores, an unhorsed pontoon-train of 42 waggons was captured.

On the 7th of August the First Army concentrated at Forbach and Saarbrück. The VIII. Corps took up a position near Spicheren, Etzling, and Behren.

On the 8th of August information was received that the enemy would take the offensive, and accordingly the defences were strengthened by forming emplacements for batteries on the north of Spicheren, placing abattis on the borders of the Spicheren woods, and entrenching the village of Etzling. These works were executed by the 1st and 3d Field Pioneer companies of the VII. Army Corps in the course of the 8th of August; but not completed, as the enemy continued their retreat in the direction of Saargemünde.

The First Army made use of the road from Volklingen through Ludweiler on their advance to St. Avold, while the Second Army moved forward on the Forbach road.

On the 9th of August it became known that the enemy had abandoned St. Avold, and had retired with the bulk of his forces as far as the French Nied.

As it appeared not improbable that the enemy intended to defend the line of the Nied, arrangements were made for drawing the armies closer together. Accordingly the First Army was concentrated at Boulay, Marange, and Bouckeborn, while the two divisions of Cavalry were pushed forward as far as Fouligny and Bettange. The right wing of the Second Army was at Faulkemont, and had orders to remain in a position intended to be prepared for defence until the proposed wheel to the right should have been completed.

In the meantime, the news that had arrived at the principal headquarters on the 12th of August made it appear as beyond doubt that the main forces of the enemy were in retreat on Metz.

In consequence, the First Army continued on the 13th of August its advance against Metz; the I. Army Corps moving towards Courcelles, Chaussy, and Landonvilliers; the VII. Corps towards Courcelles and Pange. Both Corps pushed their advanced guards over the French Nied. The VII. Corps remained in reserve, while the 1st Division of Cavalry maintained the connexion with the Second Army. The 3d Division of Cavalry had instructions, if possible, to cross the Moselle below Metz. The Second Army intended on the same day to push forward the 5th Division of Cavalry up to the road between Metz and Verdun.

As for the proposed passage of the 3d Division of Cavalry over

8 *Operations of the German Engineers and Technical Troops.*

the Moselle, it is to be remarked that there are no permanent bridges between Metz and Thionville. According to the reconnaissances made by Captain von der Groeben, of the Engineers, the river was crossed by ferry-boats drawn by ropes, with good roads leading to them on both banks at the following places, viz. :— Hauconcourt, Hagondange, Blettange, and Illange. It had also been ascertained by the reconnaissance that a passage in force across the Moselle, especially at Blettange, would be comparatively easy, as the heights on the right bank offered excellent, commanding positions for artillery, and on the left bank there was ready to hand an enclosure surrounded by high walls which could be used as a bridge-head.

As the 3d Division of Cavalry moved on to the Moselle, it turned out that all the rope-ferries had been removed; accordingly a few men crossed the river in a boat at Rauconcourt, and found no enemies' troops there. As no bridge equipment was at the disposal of the Division, and as, besides, a passage across the Moselle north of Metz in force would probably not have met the intentions of the higher authorities, the 3d Cavalry Division had to give it up. Nor could the proposed destruction of the railroad between Metz and Thionville be executed, as the enemy had assembled there in such force, that a surprise seemed highly improbable. As soon as the First Army had reached the French Nied, a greater number of passages across the river, here about 25 paces broad, were at once provided.

The Pioneers of the I. Army Corps threw 4 bridges across in the neighbourhood of Les Etangs, while the VII. Corps, with its three Pioneer companies, provided 5 bridges out of extemporized materials at Pange and Courcelles, so that, including the existing bridges not destroyed by the enemy in front of the First Army, there were altogether 15 bridges available, which would have been sufficient for all emergencies.

As decided on the 13th of August at headquarters, the First Army was to remain in its position on the French Nied on the 14th of August, and observe the enemy by advanced guards pushed well to the front. Two corps of the Second Army (the III. and IX.), moved up to the heights of Pagny and Buchy respectively, with instructions to support the First Army in case of an attack by the enemy; while the main body of the Second Army was to continue its advance on the Moselle in the direction of Pont-à-Mousson and Marbach.

Battle of Courcelles on the 14th of August.

As it was announced from all sides on the afternoon of the 14th of August that the enemy had begun to cross over to the left bank of the Moselle with his main body, and (apparently to secure his retreat) had attacked the advanced guard of the I. Army Corps, the VII. Corps advanced to the attack of the retreating enemy, and induced him again to show a front. A desperate fight ensued, which finished only with the approach of darkness, after the enemy had retreated into prepared positions under the guns of Forts Julien and Les Bottes. The 3d Division of Cavalry had covered the right wing of the I. Army Corps, while the 1st Division of Cavalry, as well as the 18th Division of Infantry, had shown on the left wing of the VII. Corps.

As regards the technical troops, a detachment of the 1st Field Pioneer company of the I. Army Corps (Lieut. Zarnke), as also the 2d and 3d Field Pioneer companies of the VII. Corps (Capts. Goetze and Cleinow), came into action. The first-named detachment fought in combination with the 44th Regiment of Infantry on the right wing of the army, which towards evening the enemy sought to overwhelm with superior forces. The contest only ceased with the approach of darkness, after the repulse of the enemy's attack.

The 2d and 3d Field Pioneer companies of the VII. Army Corps, which at the commencement of the action were formed into a half battalion by Captain Goetze, and had followed the 13th Division of Infantry up to La Planchette, were here brought up to the support of the hard-pressed infantry in the first line of battle, and on the night of the 14th of August took over the out-post duties of the 13th Division of Infantry on the field of battle they had won.

Reconnaissance of Thionville.

While the main body of the First Army was engaged before Metz, an expedition against the fortress of Thionville was undertaken by a portion of it.

On the 13th of August patrols of the 3d Division of Cavalry had ridden up to the gates of the bridge-head of Thionville, and had brought such reports of the numbers and condition of the garrison

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of the fortress that the General commanding the First Army had considered a *coup-de-main* against the fortress as feasible.

The statements of a man of the Prussian Cavalry Reserve, who at the outbreak of the war had been forced to take part in the work of the arming of the fortress, confirmed the General commanding in his view that it might easily be taken. These statements referred specially to the insufficient defensive power of the ill-guarded works on the left bank of the Moselle, as also to the facilities for crossing that river above the fortress by means of an easy ford.

Accordingly, the 31st Brigade of Infantry, under the command of General Count Gneisenau, was commissioned to execute this *coup-de-main*. He was reinforced by a light field battery, one squadron, and the 3d Field Pioneer company of the VIII. Army Corps (Captain Richter). Major von Giese of the Engineer Staff of the First Army, who many years before had reconnoitred the fortress, was placed at the disposal of the Commandant of the detachment.

The Brigade was marched off on the 13th of August on the road between Boulay and Thionville, and had orders to push forward on the evening of the 14th into the neighbourhood of the town; during the night to take up a covered position, and on the following morning early to make an attempt at taking the place by surprise. The brigade carried out the advance against Thionville as ordered, observing all requisite measures for keeping the operations a secret. Arrangements were made for a portion of the infantry, with the artillery and cavalry, to take up a position in reserve on the right bank of the Moselle, opposite the bridge-head; while three columns of assault, each with a Pioneer detachment at its head, were directed respectively against the fortifications of the town, the Moselle gorge and the railway station on the south side of the fortress, where they were to destroy the communication with Metz.

The Pioneers were furnished with the necessary scaling-ladders, petards, etc.

The 1st column, after crossing the ford, was to break the telegraph wires leading towards Metz, and then to make the railway impassable for a long time, by destroying the bridges leading over the little Mühlbach.

The 2d column got instructions to cross the ford and force their way through the Metz gate. To carry this out, it would have been necessary to remove a barrier-gate in the Place d'Armes of

the covered way, as well as the sally port-gates of the counter guard, of the ravelin, and enceinte ; also to demolish two drawbridges,—an undertaking which, with the insufficient means available, could not have had a prospect of success, unless the enemy were entirely taken by surprise.

The 3d column, after crossing the ford, was to reach the gorge of the fortress by the tow-path on the left bank of the Moselle, and scale the gorge walls.

About 3 o'clock in the morning the columns debouched out of the Yutz-wood, about 2000 paces distant from the bridge-head, but received a pretty smart fire as soon as the heads of the columns arrived in the neighbourhood of the works of the fortress, which showed that their approach was noticed. As the above-named Prussian reserve man, who had been taken as a guide, declared that the ford was no longer passable in consequence of a considerable rise in the water-level, and as in the meanwhile other parts of the fortress had opened fire, the idea of a *coup-de-main* was given up, and no doubt with good reason, as an escalade of the strong Moselle gorge, with walls from 9 to 10 metres high would probably have had as little success as the attempt to force the well-secured Metz gate.

The First Army remained for the most part in their old position on the 15th of August. The VIII. Corps was, however, sent in the direction of Chesny, to prolong the left wing, so that the army occupied the section of country from the Seille to St. Barbe.

On the 16th of August the main body of the army took up a position between the Seille and Moselle, on the line from Pommerieux to Arry, while the I. Army Corps moved towards Courcelles-sur-Nied, with instructions to remain there until the arrival of the three reserve Divisions then marching from Saarlouis in order to enclose Metz on both banks of the Moselle. A portion of the VIII. Army Corps had already crossed the Moselle on the 16th of August, and took part in the fights at Rezonville.

The Pioneer companies of the VII. and VIII. Army Corps received orders on the 16th of August to move towards the Moselle and to replace the necessary bridges for the eventual passage of the First Army.

The companies arrived before daybreak with their bridge-trains, and at once began the necessary preparatory works ; as, according to the orders left by the General commanding, the VII. and VIII.

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Army Corps were to be ready to cross over the next morning at 9 o'clock.

Bombardment of the East Forts of Metz on the 17th of August.

In order to divert the attention of the enemy from the great operations of the First and Second Armies in course of execution on the left bank of the Moselle, the I. Army Corps undertook to open fire on the east forts of Metz on the 17th of August.

Accordingly, a position for the whole of the field artillery was taken up on the heights from La Grange-aux-bois to the telegraph of Mercy, after the necessary emplacements had been constructed by the 2d and 3d Field Pioneer company, making partial use of the French rifle-pits and batteries.

The distance of the artillery position from Fort Queuleu was about 4000 paces, and the fire was principally directed against this fort. The enemy answered the fire on this side in general feebly, as the artillery armament of the forts was not yet completed. A *coup-de-main* on the 17th or 18th of August against the as yet unfinished forts Queuleu and Les Bottes, with sufficient forces, might have succeeded;* yet it is doubtful if the forts could possibly have been maintained on the following days. The army of the Rhine, thrown back towards Metz, would in any case have staked all on the recapture of the forts, the maintenance of which would have been exceedingly difficult in the absence of extended communications to the rear.

The object of the cannonade on the forts had besides been fully attained, since the enemy (according to his own statements) expected an attempt at assault every moment, and felt therefore obliged to keep back larger forces on the right bank of the Moselle.

The Second Army.

The Second Army, consisting of the Corps of the Guards of the III., IX., X., and XII. Army Corps, as well as the 5th and 6th Divisions of Cavalry, assembled near Mayence towards the end of July, and on the 30th of that month advanced to the boundary. The roads from Bingen to Volklingen were appointed for the right

* It should however be noted that, on the 17th and 18th of August, only one Army Corps was on the right bank of the Moselle.

wing of the army, while the centre, a day's march in advance, pushed on to the Saar through Meisenheim, Cassel, Neunkirchen, and the left wing through Dürckheim, Kaiserslautern, and Bliescastel.

On the 3d of August the III., IV., and IX. Corps stood in front of Alzey. The Corps of Guards, as well as the X. and XII. Corps, closed up in rear, while the 5th and 6th Divisions of Cavalry followed by two infantry divisions of the III. and IV. Army Corps constituted the advanced guards.

The arrangements of the General commanding were so calculated that the 1st Division should take up the line from Neunkirchen to Zweibrücken on the 6th of August, and push its advanced guards as far to the front as possible.

The advanced guard of the First Army took the offensive on the afternoon of the 6th of August, and forced the enemy then in retreat from Saarbrück to show front; on this the five Infantry Divisions, marching at the head of the Second Army, hastened to the assistance of the First Army, and contributed in an important measure to the success of the action.

The Second Army crossed the Saar partly on the bridges thrown over by the Pioneers of the IX. and X. Corps, and on the following days continued its advance in closer communication with the First Army.

When it had been ascertained that St. Avold had been evacuated by the enemy, and as it was supposed at headquarters that the enemy had withdrawn himself behind the Moselle, the Second Army left the direct road from St. Avold to Metz, and took up a south-westerly direction, thereby regaining touch with the Third Army, and followed the road from Saarlouis to Dieuze.

On the 11th of August, however, it appeared not improbable at headquarters that an important portion of the enemy would attempt to show fight on the left bank of the French Nied in front of Metz.

The Second Army therefore received orders to make a wheel to the right, for which the III. Army Corps at Faulquemont was to serve as pivot, and, with this object, to choose a defensive position to be strengthened by fortifications.

As, however, the enemy during the night of the 10th of August had commenced the evacuation of his strong position, the Second Army was able to resume the former line of march, and accordingly on the 13th of August advanced to the line of Buchy and Château-

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Salins, while the 5th Cavalry Division had already been pushed forward as far as Pont-à-Mousson and Dieulouard the day before, and had had orders to advance to the road from Metz to Verdun. The X. Army Corps was also to cross the Moselle at Pont-à-Mousson on this day.

This corps had already, on the 10th of August, sent First-Lieutenant Neumeister, of the Engineer Staff, with a squadron of hussars from its headquarters at Helleiner, about 9 miles from Pont-à-Mousson, to Quesnois-sur-Seille, with instructions to destroy the telegraph-wires and railways at any place between Nancy and Pont-à-Mousson, under protection of a strong patrol.

This officer got on the same day as far as the railroad referred to, and the telegraph was soon demolished, but the attempt to destroy the railway was not successful, as the enemy's infantry hurried up and opened fire, so that the detachment had to take measures for retreat. The result of the reconnaissance, besides temporarily interrupting the active movement of troops from Nancy to Pont-à-Mousson, was to discover the permanent bridges across the Moselle south of Pont-à-Mousson, the existence of which was at that time not generally known.

The Engineer Staff of the Commander-in-Chief had been already sent to Pont-à-Mousson on the 13th August in order to reconnoitre the bridges at that place, which were found quite uninjured, and a few hours later the advanced guard of the X. Army Corps moved in.

In order, as far as possible, to secure the possession of Pont-à-Mousson, which might become of the greatest importance in the further operations of the campaign, the northern portion of the town was on the 14th of August prepared for defence by the 2d and 3d Field Pioneer companies of the X. Corps (Captains Meyer and Lindow). The works were completed by midday on the 15th August, with the assistance of 2 companies of infantry. They consisted principally in defensive arrangements of hedges and garden-walls, in the construction of several emplacements for artillery, and in clearing the field of view.

On the 14th of August the Second Army moved farther on towards the Moselle, the X. Corps concentrating itself in and near Pont-à-Mousson on both banks of the Moselle, and maintaining communication with the advance guard of the corps of the Guards which was to cross the Moselle at Dieulouard. The III. Corps

was directed towards Cheminot and Vigny, the IV. towards Buchy and Many, the XII. towards Solgne and Vatrimont, and lastly the IX. towards Mantoué and Château-Salins.

As it was not possible for the First Army on the 14th August to pursue the enemy, who had retreated behind the forts of Metz, the Second Army was commissioned on the following day to take advantage of the victory that had been gained.

The Commander-in-Chief supposed that the enemy, intending to retreat on Verdun, had already gained a considerable distance in advance, and accordingly the main body of the army was directed on the roads leading north-west from Pont-à-Mousson and Marbaché-sur-Meuse, while the right wing was to cross in the neighbourhood of Pont-à-Mousson.

CHAPTER II.

PASSAGE OF THE MOSELLE.

ACCORDING to orders issued at 7 P.M. on the evening of the 15th August by the General commanding the Second Army, the III. Corps and the 6th Cavalry Division were to cross the Moselle below Pont-à-Mousson, and marching by Novéant and Gorze, endeavour to reach the high road from Metz to Verdun at Mars-la-Tour and Vionville on the 16th.

The X. Corps, which, covered by the 5th Cavalry Division, had commenced to march on Thiaucourt on the 15th of August, was to advance as far as St. Hilaire on the Verdun-Metz road.

The XII. Corps was detached to Pont-à-Mousson, and the Saxon Cavalry Divisions toward the Meuse.

The Guards Corps was to push its advance to Ramboucourt and its main body to Bernecourt, and the IV. Corps was to occupy Marbache and Les Saizerais. The last-named corps was directed at the same time to endeavour to communicate with the right wing of the Third Army in the direction of Nancy.

On the 16th of August the IX. Corps received orders to march to Sillegny, and to cross the Moselle at and above Novéant, immediately behind the III. Corps.

Finally, the II. Corps, which formed the reserve, was directed to begin to cross the Moselle at Pont-à-Mousson on the 17th of August.

The First Army had not received orders to cross the Moselle till the 17th of August.

As regards operations on the left bank of the Moselle, it was of the utmost importance to establish, immediately, as many crossings as possible, as only four permanent bridges were available. These were—

1. The suspension bridge at Corny.
2. The large bridges at Pont-à-Mousson, Dieulouard, and Marbaché.

These four bridges, which the enemy had left totally intact, were neither defended nor guarded by them, and facilitated the passage of the Moselle very much.

The immense importance of the bridges at Pont-à-Mousson, and, in a still greater degree, of the suspension bridge of Corny (which could easily have been destroyed in a very short time), is placed beyond any doubt, when it is remembered that the fortune of the day, on the 16th of August, depended very much on the power of passing troops at these points.

After the 13th of August the following additional crossings were established :—

1. *At Pont-à-Mousson.*

To facilitate the existing communications at this point, the 1st Field Pioneer company of the X. Corps, under the command of Captain Kleist, constructed a bridge close to the permanent bridge on the evening of the 13th of August. The materials of the light field Bridge-Train were partly used ; but on the following day a number of common Moselle boats were substituted.

2. *At Champey (3½ miles north of Pont-à-Mousson).*

The 3d Field Pioneer company of the III. Corps (Captain Theleman, I.), received, on the 15th of August, at 9 A.M., an order to march without delay to Champey, to construct crossings over the river there as soon as the squadron, which had been detailed to cover the operations, had arrived.

However, the senior Engineer officer of the corps, Major Sabarth, directed the company to march immediately, so as not to lose a moment. The company arrived at Champey, with the light Bridge-Train, at 12 o'clock,—a portion of the company acting as covering party. A speedy reconnaissance showed that there was not sufficient means to establish a standing bridge for all arms.*

* The Pontoon columns, which usually marched in the rear of Army Corps, could not always be brought up to the front when required, and this fact was productive of evil consequences in more cases than one. Even the Pioneer companies and the light Bridge-Train were, in some corps, not kept at the head of the advanced guards, and irretrievable loss of time was thus caused on many occasions.

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No serviceable fords could be found, owing to the current being too strong, and therefore Major Sabarth directed the establishment of a bridge for cavalry and infantry, for which it was found there was exactly sufficient materials, the bridge being about 86 metres long.

The construction of this bridge was begun at about 1.30 P.M. At 2.15 P.M. an order arrived from the 6th Infantry Division to stop work, as the passage of the river had been postponed. But, as the bridge was partly constructed, the officers commanding the company determined to finish it for the sake of practising the men, intending to dismantle it immediately after.

In the meantime the Second Army had been ordered by the Commander-in-Chief to advance, and at 8.30 P.M., just as the company was beginning to dismantle the bridge, the 6th Division received orders to cross the Moselle immediately. The Division was able therefore to begin to cross at once, and at midnight the passage was completed.

The Artillery of the 6th Division, the whole of the 5th Infantry Division, and the 6th Cavalry Division, crossed the Moselle at Corny by the suspension bridge. The Corps Artillery of the III. Corps crossed at Pont-à-Mousson. The III. Corps was thus enabled to attack the enemy in retreat on the morning of the 16th of August.

On the same day the bridge at Champey was altered so as to pass all arms.

3. At La Lobe (2½ miles below Champey).

On the afternoon of the 16th of August, between 4 and 5.45 P.M., a pontoon bridge was established near this place by a detachment of the 1st Field Pioneer company of the III. Corps, under Lieutenant Stoeckel.

It was intended to pass the IX. and XII. Corps over this bridge, and then dismantle it, but it was kept standing on receipt of superior orders.

4. At the Farm of Poncet (2000 paces southward of Champey).

This bridge was also built by the 1st Field Pioneer company of the III. Corps (Captain Kuntze), using the material of the Pontoon Train. The work was begun at 3.30 P.M. on the 16th of August,

and was not completed till 7 P.M., on account of the heavy work needed to form ramps leading to the bridge.

5. At La Lobe Poste.

On the 16th of August the 3d Field Pioneer company of the IX. Corps (Captain Schulz, II.) received orders to construct a bridge between La Lobe and Corny. No previously prepared materials were available.

A bridge 80 metres long, carried by 17 trestles, was completed on the 17th.

6. At Arry.

Between 2.30 and 4.30 A.M. on the 17th of August, the 1st Field Pioneer company of the VIII. Corps (Captain Kallmann), constructed a bridge at Arry, using the material of the Light Bridge-Train. At 6 A.M. the troops of the VIII. Corps began to cross over the bridge.

7 and 8. At Corny.

Late in the evening of the 16th of August the Pioneer companies of the VII. Corps, in bivouac at Pommerieux, received orders to construct two bridges at Corny. The companies marched to the Moselle during the night. One bridge was built above Noveant by the 1st Field Pioneer company (Captain Tunker), and the other close to the suspension bridge, by the 2d and 3d companies under Captain Goetze. The bridges were ready for traffic at 9 A.M. on the 17th.

Thus eight new passages had been established over the Moselle, and these, added to the four existing bridges, gave ample communication for all probable requirements.

The bridge-trains of the Corps of Guards, and of the I., II., VIII., IX., X., and XII. Corps* remained wholly or partially available for further service. By using these trains, eight more bridges could have been built over the Moselle, so that communications across the river below Metz might also have been established, for instance at Richemont.

It was arranged that the First Army was to cross at Corny and

* The IX. and X. Army Corps had only light Field Bridge-Trains.

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Arry, and the Second Army farther southward ; but the latter made some use of the bridges at Corny.

The river was passed without any difficulty, except that the suspension bridge at Corny swayed so much that it had now and then to be closed for some time.

The great blocks and consequent delays that must otherwise have necessarily occurred were avoided by an order that the whole of the baggage was to remain on the right bank. This order also rendered a retreat, if it had become necessary, infinitely more easy to carry out.

CHAPTER III.

OPERATIONS ON THE LEFT BANK OF THE MOSELLE.

Battle of Mars la Tour.

THE X. Corps crossed the Moselle on the 15th of August at Pont-à-Mousson, and advanced against Thiaucourt, and the III. Corps crossed on the same evening at Champey, Corny, and Pont-à-Mousson.

On the 16th of August, at 10 A.M., the III. Corps and the 5th Cavalry Division advanced to attack Vionville and Flavigny, and the hills west and south-west of these places, which were held by the enemy in strong force. A fierce fight ensued. The enemy was partially surprised and thrown back, and the 5th Infantry Division seized the heights eastward of the road from Gorze to Vionville and the Bois St. Arnould, and held them against the repeated attacks of the enemy. The 6th Infantry Division took the villages of Vionville and Flavigny.

When the sound of the cannonade was first heard, the X. Corps was on the road to Yonville. One brigade of the X. Corps arrived on the field of battle at Tronville at 11 A.M., and was able to support the overtired 6th Infantry Division.

At 2 P.M. the situation became more serious, as a corps of the enemy, which was marching on the road from Metz to Conflans by Doncourt, changed the direction of its columns and advanced to attack the heights southward of Bruville. Only a few battalions of the III. and X. Corps were available to meet this new attack. The much-threatened left flank of the 6th Infantry Division could therefore only be protected by making frequent attacks with the 5th Cavalry Division, by which the enemy was completely prevented from making further offensive movements.

While this fight was going on on its left flank, the 6th Infantry

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Division was able to repel all efforts made by the enemy on its front. Towards 4 P.M. the head of the 20th Division reached Tronville, and the Division at once commenced a close fight in the woods northward of Vionville, while the Corps Artillery took up positions against the columns of the enemy advancing from Bruville.

At midday the 19th Infantry Division, at St. Hilaire, received orders to proceed at once to the field of battle. The brigade Wedel, which formed the advance, arrived, shortly after 4 P.M., on the west of Mars la Tour, and was directed to advance through that place against the right wing of the enemy. This brigade, which consisted of the 16th and 57th Regiments of Infantry, and the 2d and 3d Field Pioneer companies, commanded by Captains Meyer and Lindow, had been formed into an additional half-battalion, as there was no regular duty for pioneers.

The 16th Regiment advanced on the left flank against an exceedingly strong position, from which the enemy opened a heavy artillery fire as soon as the regiment began to debouch from Mars la Tour. The nearest heights were successfully climbed, but the men were so completely exhausted that an attempt to storm the last steep declivity failed, and the regiment was forced to retreat on Tronville. The first battalion of the 57th Infantry Regiment, with the Pioneer half-battalion, under Captain Meyer, on its right flank, advanced on the right of the 16th Regiment, the Fusilier battalion forming a second line.

The first line pressed forward against the strong position occupied by the enemy, who, however, assuming the offensive with greatly superior numbers, forced back the weak battalions opposed to him.

The Pioneers occupied the northern and western edges of the very thick wood, and opened with rifle-fire against the left flank of the enemy. While the Infantry suffered severely in the open, the Pioneers took advantage of the gentle undulations, which afforded good protection from the murderous fire, and their loss was small in proportion. But when the French infantry, covered by thick swarms of tirailleurs, advanced down the slope of the hills which they had occupied, against the Brigade Wedel, the Pioneers, although thus favourably posted, were forced to join in the general retrograde movement. The retreat on Mars la Tour was now only possible in a southerly direction.

The 19th Infantry Division and the Cavalry were sent forward to support the brigade which was now re-forming behind Tronville, and succeeded in checking the enemy's advance. While this fight was going on, the 5th and 6th Infantry Divisions were able, by dint of hard fighting, to hold their own against the enemy in the positions which they had won. The enemy tried now to advance through the Bois des Bignons and the Bois de St. Arnould, but was stopped by portions of the VIII. and IX. Corps, which had arrived on the field late in the afternoon.

The 16th Infantry Division crossed at Corny, and disengaged the 5th Infantry Division, by attacking the enemy's reserves, which stood in the gorge between Rezonville and Gravelotte. The 25th Infantry Division covered the right flank of the 3d Corps.

Towards 7.30 P.M. the enemy made a last effort for victory, but failed, and the day's combat ended at about 9 P.M.

As we have already seen, six bridges were available at and below Pont-à-Mousson before the evening of the 16th, and these would have been quite sufficient for all communication across the river, even if the battle had gone against us. But, on the other hand, at noon and during the afternoon of the 16th, the only available bridges below Pont-à-Mousson were the lightly-built suspension bridge at Corny and the bridge which had been constructed at Champey for the passage of infantry and cavalry only, and which could by no means be considered safe if crowded.

Expedition against Toul.

On the day of the battle of Mars la Tour, the 4th Corps made an attempt to seize the fortress of Toul. The Corps had crossed the Moselle at Marbache, 9 miles southward of Pont-à-Mousson, and was within $1\frac{3}{4}$ miles of Toul. A report having come in that the fortress was held by only 300, or at most 1000, National Guards, and was not properly armed, the General commanding-in-chief determined to attempt a *coup-de-main* against it, and detailed for this purpose the 14th Infantry Brigade and 16 guns (two heavy batteries and four 4-pounders), and the 2d Field Pioneer company of the IV. Corps.

The General commanding arrived with the advanced guard before Toul at 1 P.M., and sent in a flag of truce to demand an

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immediate surrender. Although every usual formality was observed, the bearer of the flag of truce was fired on several times, and finally had to return without having accomplished his mission. The General then ordered his artillery to bombard the town from the commanding heights on the left bank of the Moselle. General Sherbening, Commandant of the 4th Artillery Brigade, and the senior Engineer officer, Lieut.-Col. von Eltester, selected suitable emplacements for the guns on the left of the road from Pont-à-Mousson, and on the heights of Mont St. Michel, completely commanding the town, at distances averaging 1200 paces. Later on, all the guns were brought to Mont St. Michel. At the same time, and with the approval of the General commanding, preparations were made to attack the place by storm, in which operation the 3d Pioneer company, under Captain von Wasserschleben, was to take a prominent part.

Under a very heavy fire the company advanced into the suburb of St. Mausny (northward of Toul), and then received orders to bridge over the wet ditch of the fortress and to force the gate. Accordingly Captain von Wasserschleben made a reconnaissance of the Rhine and Marne Canal, which formed a part of the main ditch of the fortress. It appeared that the bastioned enceinte was not revetted, but was protected by a wide and deep wet ditch. The glacis was covered with trees, and at its foot lay a road bounded by hedges and deep ditches. To arrive at the gate it was necessary first to cross the canal bridge within close musketry range of the works, and then to cross the fire of one of the bastions in order to reach the right face of the ravelin. Four non-commissioned officers and privates of Pioneers, who volunteered for this duty, rushed over the canal bridge and crept up the glacis to its crest, where they found themselves immediately in front of the ravelin.

The reconnaissance thus made showed that any attempt to force through the gate of the fortress and over the thoroughly well-protected bridge would be hopeless of success, as several coupures would have to be taken in succession.

Having heard that there was another bridge over the canal some 500 paces farther down, Captain Wasserschleben determined to cross there, so as to approach the fortress on the capital of the ravelin, and not to have to run the gauntlet of the whole front of the fortress. Leaving his half-company behind in the suburb of

St. Mausny, he crossed this bridge and was able to get within 300 paces of the foot of the glacis under cover of some hop-gardens. But here between him and the fortress lay an open field which was bounded on the side of the canal by a garden-wall. When the Pioneers had crossed about half-way over this field they were met by such a close fire of musketry and shells that it was found to be impossible to reach even the foot of the glacis. In the meantime our infantry had thrown forward skirmishers, who opened fire against the defenders of the main work. The enemy's fire then increased in vigour, while our artillery did not seem to produce any effect.

After the 16 pieces had fired 750 shells into the town, in addition to the fire of two batteries of the Third Army from the right bank of the Moselle, the bombardment was closed by order of the General commanding.

At 4 P.M. the 93d Regiment withdrew slowly. The Pioneers would not abandon their wounded comrades, and their retreat could only be effected with great difficulty by breaking through the garden-walls which lay across their path, an operation by no means easy under the circumstances.

The brigade lost altogether 300 men, and this loss would have been much greater had the enemy fired more deliberately. This unsuccessful attempt seems to prove it to be impossible to take an intact fortress by storm, especially if nothing is known about the nature of the fortifications, as was the case here, and if the attempt is made in open daylight.

On the 17th of August the main body of the IV. Corps concentrated northward of Toul, about $4\frac{1}{2}$ miles distant from the fortress. By order of the General commanding, the Engineer staff made a reconnaissance of the fortress.

This reconnaissance and the experience of the 16th of August showed that no further attempt should be made to take the fortress by a mere *coup-de-main*, since all the fronts were protected by well-built escarpments and broad wet ditches.

The Battle of Gravelotte.

After the battle of Mars la Tour, every available Army Corps was brought over to the left bank of the Moselle, so that on the morning of the 18th the First Army (VII. and VIII. Corps and 3d

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Cavalry Division) stood southward of Gravelotte and Rezonville, while the Second Army was moving in echelon from the left towards the road running northward by Conflans to Verdun, but keeping up communication with the First Army on its right.

The First Army was directed to take up a position in the Bois de Vaux and at Gravelotte, so as to cover the advance of the Second Army, while the I. Corps, which had been left behind on the right bank of the Moselle, received orders to send one brigade to observe the course of the river, and to protect the right flank of the First Army.

The Corps of Guards, the IX. and XII. Corps, formed the first line of the Second Army, the III. and X. Corps, and the II. Corps, which was still further to the rear, formed a second and third line.

At 10.30 A.M. the Second Army was wheeled to its right, the centre taking the direction of Verneville and the left wing marching on Amanvillers, it having been ascertained that the enemy had ceased retreating, and seemed willing to accept battle in a position on the heights westward of Metz. The whole force of the enemy was drawn up on these heights, stretching from St. Marie-aux-Chênes by St. Ail through the Bois de la Cusse to the cross roads at Point du Jour. The position was artificially strengthened by gun-pits and by shelter-trenches formed in tiers above one another. The right wing stretched as far as the village of Roncourt, and to the wood northward of it. The village of St. Privat, being well built, and occupying a commanding position very favourable for defence, became the strong point of the position.

Nothing was done to strengthen the position occupied by the right wing, although on the 17th of August many works were constructed about other points, particularly at Point du Jour, where shelter-trenches were thrown up and other defences to secure the left wing.

The battle began at noon, when the IX. Corps made a front attack on the strong position of the enemy. Then the artillery of the First Army opened against the heights of Point du Jour, and between 2 and 3 P.M. the infantry was engaged along the whole line. On the left wing the position at St. Marie-aux-Chênes was soon conquered, but the attack on St. Privat failed. Very hard fighting took place at all points of the field, but without decisive results in any place, owing to the intrinsic strength of the position occupied by the French.

It was nearly 5 P.M when the XII. Corps arrived on the extreme left wing, and assisted by the Corps of Guards succeeded in taking the village of Roncourt, and only then did it become possible after a fearful struggle to obtain possession of St. Privat, and throw back the right wing of the enemy.

Their left wing had been able to hold its own, and did not fall back till the II. Corps advanced to attack their position during the night between the 18th and 19th of August. Nevertheless, at 8.30 P.M. on the 18th, a brigade of the VII. Corps had succeeded in storming the villages of Vaux and Jussy, from whence it threatened the left wing of the enemy.

Although numberless cases must have occurred in the course of the battle in which it would have been possible and very desirable to obtain hasty cover for guns or infantry, still only 3 companies of the Pioneers of both armies were employed on technical duties, such as strengthening villages, etc. The 2d Field Pioneer company of the II. Corps, under Captain Grethen, entrenched the outskirts of the village of Gravelotte, in order to be prepared to meet any changes of fortune in the course of the action.

The 2d Field Pioneer company of the IX. Corps, commanded by Captain Fielder, which had occupied the edge of a wood near Verneville, when the corps advanced against the village, and had, later in the day, taken up a position on the heights of Verneville, received in the afternoon an order to place the east end of the village in a state of defence. The outskirts of the village were accordingly fortified, and long lines of shelter-trenches thrown up. Particular attention was bestowed on the defences of the church-yard, which was surrounded by a wall 2 metres high, and a farm was also put in a state of defence.

The work was only completed when the fighting ceased at 9.30 P.M. During the course of the battle, the village of Marcy was put into a state of defence by the 2d Saxon Pioneer company. Several lines of shelter-trench were thrown up, banquettes were formed for firing over walls on the outskirts of the village, gun-pits were excavated, and the masonry bridge over the mill-stream was prepared for demolition.

The 3 companies of Pioneers of the Guard (Captains von Bock, von Spankeren, and von Krause) took part in the action, and followed their corps in the storming of St. Privat.

The Pioneers of the other corps were, as a rule, left in reserve, or on guard over the bridges across the Moselle.



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OPERATIONS OF
THE GERMAN ENGINEERS
AND "TECHNICAL TROOPS"
DURING THE FRANCO-GERMAN WAR OF 1870-71.

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against a hasty attack, although surrounded by heights completely commanding the works. The town is not closely built, and consequently a bombardment with field guns could not have produced much effect. The attack could therefore only be justified on the supposition that the garrison was thoroughly demoralized. As, however, it appeared that the fortress was armed and prepared, the XII. Corps gave up the attempt, and passed the Meuse above and below Verdun.

To assist in this, the 3d Saxon Pioneer company built a bridge over the Meuse at Chancy, using the material of the Light Field Bridge-Train. The 23d Infantry Division crossed on this bridge on the 24th and 25th of August.

Only one brigade was left behind to observe the fortress, while the rest of the Corps crossed the forest of the Argonne on the 26th of August.

On that day the above-named Pioneer company received orders to break up permanently the railway between Verdun and Clermont, and, in accordance with these orders, Captain Schubert blew up the bridge at Auberville. This bridge had three pointed arches of 13 metres span; 2½ cwt. of powder were used in the demolition. All the arches were destroyed.

On the 26th of August news reached headquarters that the French army had quitted its position at Chalons, and was moving towards the north. The XII. Corps was therefore marched towards its right front, and took up a defensive position near Dun, on the Meuse, 7 miles south of Stenay, so as to be able to resist an attack coming from the west or north, for a sufficient time to permit the two Corps which had been detached from the army investing Metz to come up to its assistance.

At first the XII. Corps intended to demolish the bridges at Stenay, and Captain Portius of the Engineers, and a portion of the 3d Field Pioneer company, was sent on the 27th of August to Stenay for this purpose. But, as it was subsequently discovered that the Meuse was fordable at several places, the work was countermanded, and the bridges were only barricaded.

On the same day, by order of the General commanding, the massive bridge over the Meuse at Sassey, 2½ miles northward of Dun, was demolished, Captain Schubert blowing up one arch with 2½ cwt. of powder.

But on the following day, events having taken quite a different

turn, directions were issued to prepare to establish a new passage beside the bridge destroyed on the previous day, and to construct defensive works for the protection of Dun. These works were carried out by Infantry Pioneers, directed by the Saxon Engineer officers.

The XII. Corps remained in its position at Dun till the 29th of August, and on that day began to feel the enemy, who had advanced to Nouart.

A fight ensued, ending in the enemy retiring in the direction of Beaumont.

On the 25th of August the Guard Corps arrived at Triancourt, and intended to march on the following day to St. Menehould, but, owing to the change in the state of affairs, the Corps turned northward on the 26th, and arrived at Montfaucon on the 27th August.

According to the last news the enemy was at Bougiers, on the Aisne. It was expected that he would attempt to cross the Meuse at or near Stenay, in order thus to reach the roads leading to Metz. To meet this, the Guards, as well as the XII. Corps, were to take up a defensive position on the right bank of the Meuse, using the existing bridge at Cousenoye, and one which was to be built between Danevoux and Sivry.

Accordingly the 1st Guard Pioneer company had just thrown a bridge over the Meuse at Sivry during the night between the 27th and 28th of August, when the disposition of the forces was changed, the Guard Corps having to advance in the direction of Busancy, where several French corps had been observed moving eastward.

The IV. Army Corps.

The IV. Corps had marched in the direction of Commercy. After the 26th of August it moved in a north-easterly direction, and passed the Forest of Argonnes on the 27th, $3\frac{1}{2}$ miles west of Verdun. On this day the General commanding, accompanied by his Engineer staff, made a reconnaissance of the fortress of Verdun. It appeared that the garrison had blown up several buildings, and had burnt down portions of the suburbs, showing that they had determined to make a stout defence.

On the forenoon of the 27th of August, directions were given to build two bridges at Charny, $3\frac{1}{2}$ miles north of Verdun, so as to be

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able to pass over the whole Corps to the right bank of the Meuse on the following day, if it should seem desirable to do so. These bridges were built by the 1st and 2d Field Pioneer companies, using partly the Light Field Bridge equipment, and partly unprepared materials.

However, the Corps did not cross, as information arrived, during the night between the 28th and 29th, that the enemy still occupied Busancy.

The Third Army was in the meantime marching on Sedan, and trying to get round the enemy on the south and south-west. Under these circumstances the Army of the Meuse advanced, on the 30th of August, to attack the left wing of the enemy, which was stationed at Beaumont. The XII. and IV. Corps surprised the enemy, and drove him back to the Meuse in spite of a very determined resistance. Late in the evening the IV. Corps took by storm the town of Mouzon, which lies mostly on the right bank of the Meuse, and got possession of a military bridge which had been built by the enemy.

The 1st Field Pioneer company, which had been attached to the 16th Infantry Brigade, was employed as infantry, and, acting with a battalion of the 96th Infantry, took part in the storming of Beaumont and Mouzon, suffering some considerable losses.

The army crossed over the Meuse during the night between the 30th and 31st of August, using the bridges which had been left uninjured, and two other bridges which had been built near Lettanes by the Pioneers of the Guards and of the XII. Corps. The 1st Guard Pioneer company having restored the partly-destroyed bridge over the Chiers, the Guards crossed on the 31st of August and occupied Carignan.

Later on we shall see how the left wing of the army crossed the Meuse below Sedan on the same day, thus intercepting all the enemy's lines of retreat, and forcing him either to accept battle under the most unfavourable circumstances, or to cross over into the neutral territory of Belgium.

CHAPTER V.

OPERATIONS OF THE THIRD ARMY UP TO THE
BATTLE OF SEDAN.

THE Third Army, which was originally composed of the V. and XI. Army Corps, the 2d Cavalry Division, the two Bavarian Corps, and of the Würtemberg and Baden Field Divisions, was concentrated, at the end of July, at Speyer, Landau, and Germersheim.

The army had advanced to this position under cover of the fortresses of Landau and Germersheim, the arming of which fortresses was so far completed that they were already fully defensible.

From the beginning the Germans considered it probable that the enemy would make an attempt to cross the Rhine in the neighbourhood of these fortresses, and therefore every exertion was made to prepare for such a contingency.

In the first instance, on the 23d of July, the railway bridge on the line between Kehl and Strasburg was thoroughly destroyed by a detachment of the Baden Garrison Pioneer company, under Lieutenant Count Traun. A large charge of powder was used for this purpose.

As it was known that the enemy in Strasburg had several gun-boats at their disposal, preparations were begun on the 16th of July to close the river by a barrier, which it was originally intended to construct at Plittersdorf. Sufficient materials could not, however, be obtained for this purpose, but, in order to give security to the fortress of Rastadt, the mouth of the Murg was closed by stone walls, erected by a detachment of the Baden Pontoon company, under Lieutenant Prestenbach.

The Germans considered it probable that the enemy would cross the Rhine at Maxau, where the railway between Carlsruhe and Wieden crosses the river on a pontoon bridge.

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Orders were therefore issued from the Baden Field Division, on the 18th of July, that field-works should be thrown up and a barrier constructed in the river for the security of this very important point.

The works were begun on the 20th of July by a detachment of the Baden Pontoon company, under First Lieutenant Asbrand. During the following days, seven ships filled with stones were sunk and connected together by chains and cables.

As it appeared on the 23d of July that this barrier was insufficient, owing to a rise in the river and the ships sinking into the sand, a second barrier, this time a floating one, was constructed on the same day about 400 paces below the first one. It consisted of fifteen rafts, containing each fifteen balks, which were joined together by chains and cables. The first barrier was also improved by sinking more ships, and by the addition of intervening rafts, and arrangements were made for removing, at the shortest notice, the bridge of boats which carried the railway.

Finally a flying-bridge was constructed with the materials of the bridge of boats which had previously been removed from Kehl, and all available steamboats were kept ready, so that ample provision was made for crossing the river.

On the 30th of July a regular river-watch was organized by the Pioneers, news having arrived that attempts would probably be made from Strasburg to destroy these barriers by means of heavy rafts and torpedos. The barriers were finished and made very perfect on the 3d August, having been much strengthened. Among other things a strong wire-rope was stretched from shore to shore above the barriers.

With the assistance of civil labour, the works for the protection of the Maxau bridge, which were begun on the 22d of July, were also finished on the 3d of August.

On that day the Baden and Würtemberg Field Divisions crossed the Rhine at Maxau, and under the then aspect of affairs it seemed unnecessary to add to the strength of the works.

At the same time the garrison of Rastadt was directed to send out two parties to cross the Rhine during the night between the 3d and 4th of August, for the purpose of making reconnaissances. The Baden Garrison Pioneer company, under Captain Koch, was charged with the duty of passing these detachments over the river. The Pontoon waggons were brought to Plittersdorf on the evening

of the 3d of August, and the passage of the first column began on the morning of the 4th of August, at 1.30 A.M. The enemy, however, opened a heavy fire on the pontoons, and the infantry retired in obedience to orders. The second column was embarked at the mouth of the Murg, and landed at Münchhausen. The company of infantry was, however, fired upon by the enemy, who had occupied the village in force, and therefore retired again to the right bank of the Rhine. First-Lieutenant Walther had charge of the passage of the troops.

The headquarters of the chief command were at Landau on the 3d of August, and all dispositions for the advance of the army were made on this day. According to these the II. Bavarian Corps and the 2d Cavalry Division were to form the right wing, the V. and XI. Corps the centre, and the Baden and Würtemberg divisions were placed on the left wing of the army, which was to advance on the line from Weissenburg to Lauterburg, the I. Bavarians being kept in reserve.

The Battle of Weissenburg.

On the morning of the 4th of August all the columns began their advance towards the Lauter.

The duty of taking the ancient fortress of Weissenburg was specially given to the 4th Bavarian Infantry Division, and arrangements were accordingly made by this division to set fire to the town by carcases, and at the same time to attack by escalade.

A detachment of the 4th Bavarian Field Engineer company (under First-Lieutenant Pauer), strengthened by 60 Infantry Pioneers from the 4th Infantry Division, was charged with the preparation for carrying out the escalade. This detachment collected the largest procurable number of fire ladders, and started at 8 A.M. with the advanced guard in the direction of Weissenburg.

It soon became evident that the enemy had occupied the town strongly, and intended to make an energetic defence. The gates were strongly barricaded and the parapets and walls thickly occupied by riflemen, so that the advanced guard could only gain ground slowly. No supports came up for a long time, and therefore the Pioneer detachment was ordered to the rear, in order to put the village of Schwaigen into a state of defence.

As the storming was not attempted for some time, the Pioneers had sufficient time to complete their task, and during the course

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of the morning the streets of the village were barricaded and various houses and gardens prepared for defence. In the meantime the Bavarian Artillery continued to bombard the town.

The v. Corps had received orders to attack the commanding position called the Geisberg, and deployed for action at 10.30 A.M. They soon obtained possession of Altenstaedt, and therewith of the passages over the Lauter, and immediately proceeded to attack the Geisberg and to storm the southern parts of Weissenburg.

The xi. Corps arrived on the left wing about midday. It had crossed the Lauter at 8 A.M. by four bridges, some of which were restored and some newly built by the 1st Pioneer company. While the 18th Brigade of Infantry advanced against the front of the enemy, the 41st Brigade tried to turn his right flank. At the cost of heavy losses, the Geisberg, the key of the French position, was finally taken.

The storming of Weissenburg was successfully carried out by the v. and ii. Bavarian Corps, after the gates had been destroyed by artillery.

The enemy retired, and the line of the Lauter was entirely in the hands of the Germans, as General Werder's corps had occupied Lauterburg and crossed the river on three bridges constructed by the Würtemberg Pioneers. On the 4th of August, in the course of the day, some Bavarian Engineer officers examined the works of Weissenburg, and made the necessary preparations to repel an attack, should the enemy attempt to make one.

On the evening of the 4th of August it was decided that the army should continue to advance towards Strasburg on the 5th, and should on that day take up a general position at and beyond Sulz ; while the Cavalry should reconnoitre as far as Reichshofen, and, if possible, break up the railway there and at Hagenau.

All the reports received on this day agreed that the enemy was concentrating westward of Woerth, and drawing in reinforcements by means of the railway. In consequence of this, the army began to wheel to the right, and it was intended not to attack the enemy till this had been carried out.

Battle of Woerth.

The reconnaissance skirmishes commenced by the advanced posts of the v. and xi. Corps, and of the ii. Bavarian Corps, during the

early morning of the 6th of August, induced the General commanding the v. Corps to bring up the whole Corps' artillery at about 8 A.M. in order to support the right wing, which was hotly engaged.

In the meantime, at about 10 A.M., the xi. Corps had arrived on the heights northward of Gunstedt. The senior Engineer officer, foreseeing that the German left wing would shortly have to cross the Sauer, recommended the General commanding to bring up the Light Field Bridge-Train, as there was only one bridge existing, viz. on the road from Gunstedt to Dürrenbach. But as at this time there was no intention to cross the Sauer, the recommendations of the commanding Engineer, although reiterated, were disregarded.

After 10.30 A.M. fresh dispositions were made, and it having been determined to cross the Sauer, orders were given to prepare bridges; as however the Light Bridge-Train was very far behind, so much time was lost that it was 1 P.M. before the bridges were finished for the passage of the troops.

These were built by the 1st Field Pioneer company of the xi. Corps (Captain von Holly), in the neighbourhood of Spachbach, one mile south of Woerth, and were of great service later in the day for the passage of the reserves.

The xi. Corps occupied the village of Gunstedt and the neighbouring height, and succeeded in driving back all the attacks made by the enemy, who, in his second attempt, penetrated as far as the edge of the village. About noon the 22d Division appeared southward of Gunstedt, and pushed forward in the direction of Ebersbach, driving back the enemy's Infantry, which was advancing from Morsbronn.

The 3d Field Pioneer company of the xi. Corps under Captain Kuester, which was following the 43d Infantry Brigade, did duty as infantry on this occasion. In the advance on Morsbronn the company was charged by French cuirassiers, when it formed square with a detachment of infantry, and the attack was repulsed, although a corner of the square was broken. The company then prepared a position with shelter-trenches across the road leading from Morsbronn to the Moderwald to support the 43d Infantry Brigade, which was advancing against Ebersbach.

During the afternoon the whole of the xi. Corps advanced on the right bank of the Sauer against Woerth, while General von Werder's corps received orders to take up a position in reserve at

Gunstedt. About the same time the advanced guard of the v. Corps had taken possession of Woerth after severe fighting.

The 1st Field Pioneer company, under Captain Scheibert, which was with the advanced guard, began at about noon to restore three bridges, which had been destroyed by the enemy, who kept up a heavy fire on the village from the western heights, causing several casualties in the company. Two bridges of improvised materials were also built across the Sauer, below Woerth, during the afternoon by the 2d Pioneer company, under the command of Captain Hammell. The work was delayed by the fire of the enemy's riflemen, who were hidden in the neighbouring houses, so that the company suffered several losses. The enemy was however driven out, and the work was then speedily finished.

In the beginning of the action the 3d Pioneer company, under Captain Guentzell, had received orders from the senior Engineer officer, Major von Owstien, to leave its waggons behind and to accompany those Infantry battalions which were advancing on the left flank of the corps towards Spachbach in order to take up the touch with the xi. Corps. The company found there three battalions who were unable to cross the rather deep stream, although a few men had managed to scramble over. By using strong hoppoles three foot-bridges were speedily constructed, although partially injured by shells. These improvised bridges were used by a large number of troops, and even by some mounted men when the v. Corps subsequently recrossed, and were of great service.

When, later on, the Würtemberg Division and the xi. Corps advanced and crossed the Sauer, a fourth foot-bridge was built and two regular bridges were begun under fire; but these latter were not finished till nearly nightfall, because the Light Bridge-Train did not come up in time. While thus employed, the company suffered many losses.

At 1.30 P.M. the v. Corps advanced in the direction of Froschweiler, while at the same time the xi. Corps was sent forward against Elsasshausen, south-westward of Woerth. The fight surged backward and forward for a long time. The v. Corps was partly forced back into the village of Woerth. The officer commanding the 1st Pioneer company of the v. Corps, which was at the time in the village, speedily assembled the Pioneers, who were at work at the bridges, as well as a large number of other troops who were scattered, having lost their officers. With these troops

he advanced in the direction of Froschweiler, after the taking of the Weinberg, which the enemy had defended in the most determined manner. On this occasion the Pioneer Company suffered great loss, about one-third of their strength.

At 3 P.M. Froschweiler was attacked from three sides. The II. Bavarians and the V. Corps advanced against it on the east, the Würtembergers on the south, and the XI. Corps on the west. At 3.30 P.M. the village was taken, and the enemy retired in the utmost confusion on Reichshofen.

Advance on the Vosges Mountains.

On the 8th of August the Third Army began its advance on the Vosges Mountains, being now increased by the addition of the VI. Corps and the 4th Cavalry Division.

The 12th Infantry Division and the II. Bavarian Corps formed the right wing. The centre was formed by the I. Bavarian Corps, the Würtemberg Division, and the V. Corps. The left wing consisted of the XI. Corps and the 2d Cavalry Division. According to marching orders the position of the army on the 12th of August should have been on the line from Saarunion by Fenestrange to Saarbourg.

The Baden Division and the 11th Infantry Division were advanced towards Hagenau, to protect the army against any attack from Strasburg.

On the 8th of August orders were given to the Würtemberg division to take the two small places, Lichtenberg and Luetzelstein (La Petite Pierre) by a *coup-de-main*.

The fortified castle of Lichtenberg lies close to the road between Hagenau and Ingweiler; but does not actually command it, and is therefore of no great value for the defence of the passes of the Vosges Mountains. It is perfectly secure against escalade, and is provided with bomb-proof cover for its garrison. The detachment told off to act against Lichtenberg consisted of two and a half battalions of Infantry, half a squadron, two batteries, and a detachment of the Würtemberg Sapper company, under First-Lieutenant von Milkau. It arrived at its destination at 9 A.M. on the morning of the 9th of August. Lieutenant Milkau, assisted by several non-commissioned officers of Pioneers, made a special reconnaissance, and, protected by a patrol of riflemen, he was able to penetrate into the palisaded covered way, and from thence, having

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blown down an entrance-gate, he even reached the ditch of the fortress.

It appeared from this reconnaissance that an assault would probably not be successful unless a breach were previously made in the east side of the fortress. As however this would have required too much time, the officer commanding the detachment determined to bombard the fortress in order to force it to surrender, and succeeded, after a bombardment of twelve hours' duration, the artillery having been augmented to 18 pieces. The greater part of the detachment had already begun to retire, but a great fire which spread during the last hour of the bombardment induced the commandant to capitulate, surrendering 280 men and 7 guns. The Würtemberg Artillery had fired 1300 shells.

The small fortress of Luetzelstein closed the road from Hagenau to Saarunion, a line of the utmost importance for the advance of the Third Army, and, although old and dilapidated, it had been so far restored that it was certainly capable of offering resistance for a few days. On the approach of the Würtemberg advanced guard the enemy, however, abandoned it, leaving 6 rifled guns behind them.*

The Engineers and Artillery belonging to the staff of the XI. Corps, and the 1st Field Pioneer company belonging to the same corps, reconnoitred the fortress of Phalsburg on the 10th of August, and selected positions for batteries.

The fortress of Phalsburg closes the roads leading to Saarunion, Dieuze, and Saarburg, but has no direct command over the railway between Strasburg and Nancy, which passes a little above a mile further south. Although after the fall of Luetzelstein Phalsburg could be turned, it was nevertheless absolutely necessary to

* In the archives of this fortress the Engineers attached to the headquarter staff found some interesting correspondence.

It appeared from these, that the order of 29th July directing all fortresses to be put on a war footing only reached the fortresses of the departments of Haut and Bas-Rhin on the 3d of August, and even this order did not give full powers to local authorities to make good their stores, but directed requisitions to be sent in.

Under date of the 1st of August information was sent that the Minister for War would appoint commandants for Luetzelstein and Lichtenberg. On the 3d of August the 'Garde du génie' (the commanding Engineer) received, in answer to his request for more artillery, a reply from a Colonel of Artillery giving no decisive answer as to the time when the supply would be sent, or even if the demand would be ever complied with; but expressing nevertheless the expectation that the places would hold out well, and bar the advance of the Germans.

reduce it as speedily as possible, as the etappen roads to Nancy and Luneville could only be rendered safe by doing so.

The fortress was in good repair, and possessed several bomb-proof barracks.

The reconnaissance showed that in all matters relating to the Artillery and Engineers the fortress was fully prepared, and that an attempt at escalade would be almost hopeless, owing to the ditches being furnished with escarp and counterscarp revetements from 7 to 8 metres high; but as it was supposed that the garrison would consist of badly armed and demoralized Mobile guards, the fortress was summoned to surrender, though in vain. The 1st Pioneer company prepared ladders for escalading, and began to throw up emplacements for the guns. It was nearly dark when the artillery of the XI. Corps began the bombardment, but firing was soon stopped, as the corps received orders to continue their march.

The Engineer and Artillery officers attached to the staff of the Commander-in-Chief reconnoitred the fortress again on the 11th of August, in order to determine the number of troops required for an investment and for the security of the etappen road by Luetzelstein. Three battalions and 2 batteries were detailed for the first purpose; and 1 battalion, 1 squadron, and 1 battery for the second.

As it had turned out that on the 11th of August, in the concentric lines of advance of the Second and Third Armies, the troops had got mixed up, the right wing of the army was directed, not on Saarunion, but on Fenestrange, the 4th Cavalry Division keeping up connexion with the Second Army. The 11th Division was temporarily intrusted with the investment of Phalsburg.*

The II. Bavarian Corps and the 12th Infantry Division marched on the right wing of the army on the road from Weissenburg to Bitsch. As the II. Bavarian Corps marched on a road which was closed by the fortress of Bitsch, an attempt was made on the 8th of August to induce the place to surrender by bombarding it, but without effect.

In order not to lose time, preparations were immediately begun to construct a road round and clear of this fortress, on the south

* In the meantime orders arrived from chief headquarters to begin the siege of the fortress of Strasburg, and the Baden Field Division was attached to the newly formed Siege Corps. Major-General Schultz, commanding the Engineers of the Third Army, and Captain Heyde, were temporarily attached to the Siege Corps to make the first preparations for the investment, etc.

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side of it, and the work was so far advanced by 11 A.M. on the 9th of August that the Corps was able to continue its march. This duty was performed by the 2d Field Engineer Division, directed by Lieutenant-Colonel Fogt.

This road passed through a thickly-wooded mountainous tract of country, and united the villages of Egelshardt and Lemberg southward of Bitsch, and was rather more than $5\frac{1}{2}$ miles long. The Pioneers were distributed along the whole length of the road, and were able, by great exertions, and by using the horses of the Engineer Train, to prevent all stoppages, so that the Bavarian Corps was able to pass the fortress by early morning on the 10th of August.

The Third Army met with no other particular difficulty in its advance, as soon as the fortress of Marsal, lying on the road from Saarunion to Nancy, had surrendered after a short bombardment to the II. Bavarian Corps. The explosion of a badly-protected powder-magazine and the great want of artillerymen seem to have been the principal causes of this surprisingly quick capitulation, as the fortress was well able to have offered a longer resistance.

The numerous bridges over the Saar and over the Marne and Rhine Canal, which had been blown up, were in a short time either restored or replaced by floating bridges, made out of boats and timber found on the spot by the Pioneers of the V. and XI. Corps, and of the Würtemberg Division, so that no delay occurred in the occupation of the important town of Nancy.

The bulk of the Third Army were in or near Nancy, and awaited the result of the decisive battles fought near Metz between the 14th and 18th of August. On the 20th of August it recommenced its advance on Châlons. On the 16th of August the advanced guard of the army (the II. Bavarian Corps), had pushed forward strong detachments upon Toul and Pont St. Vincent, and taken possession of the bridge which spans the Moselle at the latter place. As has already been mentioned, some Bavarian batteries belonging to the advanced guard took part in the bombardment of Toul by the IV. Army Corps on the 16th of August. As this fortress closed the roads leading direct to Chalons, it became necessary to construct a road to turn it, which was accordingly done round the south of Toul, through Gondreville and Villey-le-Sec to Pierre la Treiche, where a bridge was thrown across the Moselle by the 5th and 6th companies of Bavarian

Engineers, under the direction of Major Kern, on the 18th of August. The II. Bavarian Corps immediately began to cross the river, and on the following day reached the road from Toul to Châlons. This bridge was replaced during the following days by one built of materials collected on the spot. Large Moselle boats were used in the construction of the latter bridge, which was built between the 22d and 24th of August by a detachment of the 6th Field Engineer company (First-Lieutenant Biekhofer).

Besides this, several bridges were restored and built by the Pioneer companies of the other Army Corps further above Toul, particularly at Flavigny and Bayon, so that the passage of the Moselle could be accomplished without any considerable delay.

As the bridge (65 metres long) which was built at Méreville by the Würtemberg Pioneers on the 17th of August was not used, it was dismantled on the following day. On the other hand, two military bridges were constructed near Bainville-sur-Madon for the use of those troops who were to cross at Flavigny.

Second Bombardment of Phalsburg.

On the 12th of August the Commander-in-Chief had directed the 11th Infantry Division, which marched on the left flank of the army, to bombard Phalsburg, and attached to it 10 field-batteries for this purpose.

On the evening of that day the Staff of the Artillery and Engineers belonging to the VI. Corps made a reconnaissance of the fortress, and selected the Weschheim range of heights north-west of the town as the position for the batteries.

Emplacements for the guns were prepared on the evening of the 13th of August by the 2d and 3d Field Pioneer companies, and at the same time several Engineer officers made a special reconnaissance, which showed that there would be no probability of success in an attempt to storm the works while still intact.

The guns were brought into their positions before daybreak, and opened fire at 7.30 A.M. with good effect, flames speedily appearing in various parts of the town. The enemy answered with about ten guns, but without doing us any injury.

At 1.30 P.M. an Infantry company advanced as far as the glacis in order to drive the artillery of the garrison from their guns. The enemy did not, however, waver in their defence, and steadily refused

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to capitulate, although twice summoned to do so in the course of the afternoon.

In accordance with superior orders, the troops thereupon resumed their march towards Saarburg, leaving behind one battalion to watch the fortress.

Second Bombardment of Toul.

We have already related that the IV. Corps attempted, without success, a *coup-de-main* against the fortress of Toul on the 16th of August. The Commander-in-Chief of the Third Army attached particular importance to the reduction of this fortress, which commanded the railway between Frouard and Paris.

Major Schumann, belonging to the Engineer staff of the Third Army, and Lieut.-Colonel Fogt, director of the Field Engineers of the Bavarian army, made a reconnaissance of the fortress on the 18th of August and the following days. It appeared that a number of heavy guns would be certainly needed for a speedy reduction of the fortress, but for the time being none were available. The Commander-in-Chief determined therefore to try the effect of a bombardment with field-pieces, and the Corps Artillery of the VI. Army Corps and 2 Bavarian field-batteries were given for this purpose. The 2d Field Pioneer company built 36 emplacements on the heights of Dommartin for the batteries of the VI. Corps, while the Bavarian batteries were placed on Mont St. Michel. One Infantry regiment of the VI. Corps and a Bavarian brigade covered and protected the batteries, which were at an average distance of 2500 paces from the works.

The bombardment took place on the 23d of August, and although several fires were started in the town, the enemy refused to surrender. About 3000 shells were fired.

The firing was only feebly returned by the garrison with from 6 to 10 large guns.

As it seemed most important that the Third Army should participate with all available strength in the suddenly ordered movement toward the right, both the bombardment and the complete investment of the fortress were given up, and only the etappen road was guarded by Landwehr troops.

Advance from the Moselle on Sedan.

The Third Army continued its advance towards the Meuse, and found nearly all the bridges intact, so that there was no delay in crossing the river.

To protect the left flank of the army, the XI. Corps detached the 3d Field Pioneer company on the 21st of August from Gondrecourt, with directions to break up the railway between Chaumont and Châlons. The VI. Corps also broke up the railway from Troyes to Paris, at a place nine miles north-west from Troyes, on the 26th of August. A detachment of the 3d Field Pioneer company, commanded by Captain Scholl, and escorted by detachments of the 2d Cavalry Division, carried out this duty successfully, and only rejoined the Corps at St. Ménehould, having marched 144 miles in four days.

Although both of these works of destruction were thorough for their purpose at the time, they did not act subsequently as obstructions to our own movements, care having been taken not to destroy any of the larger constructions.

On the 25th of August the left wing of the Third Army reached Vassy, while the right wing made good its connexion with the army of the Meuse in the neighbourhood of Clermont. The fortress of Vitry, lying on the railway from Toul and Chaumont to Paris, had opened its gates to the advanced guard of the 4th Cavalry Division on this day, and the road to Paris lay fully open. In spite of its important position the fortress was not prepared for defence either in works or armament, and its garrison consisted of but a few hundred Gardes-Mobiles.

The advance on Paris had to be given up for the time, owing to the news of the march of Macmahon's army on Montmédy, and accordingly, on the 26th of August, the Third Army got orders to move towards the right.

The VI. Army Corps, forming the left wing of the army, arrived on the 28th of August at St. Ménehould, and started on the 30th of August for Vouziers (22 miles south-west of Sedan), where it remained in reserve, and re-established the crossings over the Aisne, which had been destroyed by the enemy. Furthermore, the railway between Rheims and Mézières, which was in constant use by the enemy, was broken up for a length of 200 paces by a detachment of the 3d Field Pioneer company, near Rethel, on the 31st of August. The rails were removed and the embankment cut

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through, and the line was thus rendered unserviceable for a long time.

The v. Army Corps concentrated by the 31st of August at Chemery, and the Engineers made reconnaissances to find out suitable places for establishing crossings over the Bar* and over the Meuse Canal, should a movement toward the left be subsequently decided upon. During the following night the corps was ordered to cross the Meuse westward of Donchery, and the necessary reconnaissances and preparations were immediately made by the Engineer staff; so that the 1st Pioneer company was able to complete the bridge before break of day. It was 45 metres long, and was constructed in half an hour.† At the same time ramps were made to cross the embankment of the railway between Mézières and Sedan so as to enable the columns of the v. and xi. Corps to pass.

The Würtemberg Division, which followed the v. Corps, arrived at the Meuse on the 31st of August. The Pioneers and some riflemen crossed over the river at Flize in some boats found on the spot, and drove off the weak detachments of the enemy who watched the river. At the same time the railway from Sedan to Mézières, on the right bank of the Meuse, was broken up near Nouvion by a Pioneer detachment under First-Lieutenant Schill.

In the meantime Captain von Schott had made a reconnaissance of the Meuse, and at 1.30 A.M. orders arrived to bridge the river. This work was begun at 5.30 A.M. under the direction of Lieut.-Colonel Loeffler, and was finished in half an hour. There was a thick fog at the time, and the working parties were covered by a company of rifles. The bridge was 60 metres long, and had to be approached by long ramps. The Würtemberg Division and the Cavalry Division began to cross over it at 6 A.M.

On the 29th of August, during its advance on the Meuse, the xi. Army Corps received orders to construct as many crossings as possible over the Aisne, so as to be able to march to the right across the Ardennes if necessary, and accordingly six crossings were established by the Pioneers. But on the 30th fresh dispositions were made. The Corps continued their march towards the north, and concentrated at Stonne, 4½ miles west of Beaumont.

* Otherwise known as the Canal des Ardennes.—(Translator's note.)

† This bridge was dismantled on the 3d of September, and was replaced by one built of materials procured on the spot, by men under the command of officers attached to the Pontoon column of the v. Army Corps.

Early on the morning of the 31st of August, the Corps received orders to march to Donchery in order to secure the passage of the Meuse at that point. Accordingly the Engineer staff, accompanied by a small escort of Cavalry, reconnoitred the left bank of the Meuse and reached the heights southward of Donchery. As Donchery appeared to be unoccupied, and as none of the enemy's troops were seen on the bridge, the railway in the neighbourhood of the station was broken up, the railway officials assisting in the work, and at the same time the bridge over the Meuse, which had been partly destroyed, was repaired.

The reconnaissance of the Meuse was then continued, and a bridge was built over the river at a point below Donchery, before 3 P.M., by the 1st Field Pioneer company of the XI. Corps. There was no Infantry to cover the operations, and the company was obliged to cover itself against the attacks of the scattered French troops. It was nearly evening before Donchery was occupied by the XI. Corps.

The railway bridge over the Meuse, about 2000 paces below Sedan, was occupied on the evening of the 31st of August by troops belonging to the XI. Corps, and works for its defence were constructed by the 1st Field Pioneer company, under Captain von Gaertner.

The Commander-in-Chief, however, ordered it to be thoroughly destroyed, and it was accordingly reduced to a mass of ruins later in the evening, by a detachment of the 3d Field Pioneer company of the XI. Corps, under Captain Kuester. The bridge lay close to the French camp, and preparations had already been made by them to destroy it. All that remained to be done was to place the charges of powder so as to destroy all the arches, and the railway was thus cut for a full distance of 70 metres.

Early on the morning of the 1st of September there were altogether four bridges available for the Third Army below Sedan, and this was reckoned quite sufficient. If the Pontoon column of the V. Corps had been used, two more passages could have been established if required.*

The I. Bavarian Corps formed the right wing of the Third Army. It marched by Roncourt on Remilly, drove back the enemy to the Meuse, after heavy fighting on the 30th and 31st, and seized the

* There had been some delay in the mobilization of the Pontoon column of the XI. Army Corps, and it only arrived before Sedan on the 2d of September.

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large railway bridge at Bazeilles. This bridge was immediately made available for all arms by the 1st Engineer Company. In the meantime Lieutenant-Colonel Riem, director of Field Engineers, had reconnoitred the river, and selected several places suitable for bridges.

Above Sedan the Meuse is about 60 metres wide, and has an average depth of 3·5 metres. The banks are everywhere easy of approach. The 1st Bavarian Field Engineer Division, under Major Staudacher, succeeded by 2.30 P.M. on the 31st of August in bringing the Bridge-Train, consisting of 30 waggons, down to the Meuse, although the roads were dreadfully crowded, and two bridges were immediately begun at a place about 2000 paces above the railway bridge. The work was completed in the face of the enemy, the men working under artillery fire. The bridges had nevertheless to be again dismantled according to superior orders, as the Bavarians were on this day to quit the right bank of the Meuse. Half of each bridge was removed after having been crossed by the troops returning from Bazeilles.

Orders were given at 3 A.M. on the 1st of September by the General commanding the Corps, to complete the bridges, and in ten minutes the two Bavarian Brigades began to cross over one of them, but the second bridge, having been partly constructed of unprepared material, was not ready for traffic till nearly 6 A.M.

Altogether, including the bridges built and seized on by the Army of the Meuse, there were seven bridges above Sedan available for the service of the two armies. By making use of the Bridge-Trains of the IV., XII., and II. Bavarian Corps, five more crossings could have been established if required.

CHAPTER VI.

THE BATTLE OF SEDAN.

AS we have already seen, the greater part of the Army of the Meuse had crossed the Meuse and the Chiers on the 31st of August, while the Third Army had only pushed over small parties for the protection of the bridges.

The I. and II. Bavarian Corps stood at and southward of Remilly, opposite to Bazeilles. The v. Corps was at Cherny; the XI. at Donchery; the Würtemberg Division at Boutacourt, $4\frac{1}{2}$ miles westward of Bouchery; and the VI. Corps was stationed 23 miles southwest of Sedan in readiness to fall on the flank of the enemy and force him to halt, should he by chance still get an opportunity of marching westward.

The Army of the Meuse.

In the early morning the XII. Army Corps had taken up a favourable position two miles east of Sedan, and, in concert with the Guards, had completely shut in the French on the east side, and repulsed all their attacks. Later on, the two Corps moved more northward to Illy, where, at 3 P.M., they joined hands with the v. Corps. The interval between them and the right wing of the Third Army, which was advancing on Bazeilles, was filled by the IV. Corps. All disposable guns were brought up on to the heights as soon as they had been taken, so that about 100 pieces were in action on the right wing.

The Pioneers of the IV. Corps constructed, during the action, several foot-bridges over the streams and ravines eastward of Bazeilles, and then followed their Divisions to the field of battle.

The Third Army.

The I. Bavarian Corps attacked Bazeilles early in the morning, when some very hard fighting took place. Being reinforced by a division of the II. Bavarian Corps, it succeeded however in driving the enemy through Balan to Sedan. The II. Bavarian Corps shut in Sedan from the south-west and rested with both wings on the Meuse. The Corps Artillery was placed on the heights westward of Fresnois. These positions were of great strength owing to their commanding height.

The V. and XI. Corps drove the enemy out of his position north-west of Sedan. At 11 o'clock both corps were in position on the line from St. Monges to Fleigneux, their right flank resting on the Meuse. The Würtemberg Division was at the same time standing between Donchery and Dom-le-Mesnil, and protected the rear of the two corps in the direction of Mezières. A Cavalry Division observed the right bank of the Meuse above Donchery. While three Bavarian Divisions were thus fighting at Bazeilles, and the extreme right wing of the army of the Meuse was getting nearer and nearer to Sedan, the V. Corps advanced to attack the position occupied by the enemy at Floing and Illy, north-west of Sedan. Here also the enemy was driven back after hard fighting. All counter attacks made by the enemy were repelled, and at 3 P.M. Sedan was completely hemmed in.

The 2d and 3d Companies of Pioneers of the XI. Army Corps were several times engaged. The 2d Company, under Captain Eckert, took part in the attack on Floing, and rallied about 100 stray infantry soldiers of different regiments, who were placed under the command of First-Lieutenant von Appell, an officer of that company. By order of the officer commanding the 32d Foot, they were placed on the right of that regiment during the attack on Floing.

Acting in concert with parts of the 32d and 25th Regiments, the 2d Company drove back the constantly repeated attacks made by the enemy on these heights (which were only about 300 paces from the works of the fortress), though not without much loss. At about 2 P.M. the company put a garden-wall which lay about 150 paces behind the front of the position into a state of defence, while Lieutenant von Appell's detachment repelled several attacks

made by parties of French Cuirassiers, and took a great number of prisoners.

The 3d Field Pioneer company (Captain Kuester), which had advanced with the 43d Infantry Brigade against Floing, was attacked at about 2 P.M. by two squadrons, but the fire of the deployed company and of a weak body of Infantry drove them back, when they were surrounded by the German Cavalry and nearly all taken prisoners.

After the whole army of the enemy had been shut up in the fortress, the Bavarian batteries on the south side of the town opened fire for the purpose of hastening the catastrophe. Firing was, however, stopped at about half-past 5 o'clock, as the French army desired to capitulate.

But as it was still possible that the French might reject the conditions offered to them, dispositions were made by several corps to frustrate any attempt that might be made to break through. The 3d Field Pioneer company received orders from the IV. Corps at 8 P.M. to put the conquered villages of Bazeilles and la Monzeille and the railway bridge over the Meuse, southward of Bazeilles, into a state of defence. As the village of Bazeilles was all in flames, and all the streets filled with the ruins of fallen houses and walls, nothing could be done in the way of fortifying it, but a position further back resting on the Meuse was selected and strengthened. These works were completed during the night between the 1st and 2d of September.

The heights round Sedan were also reconnoitred by the Engineer staff of the various corps, and positions were selected for emplacements for batteries, should it become necessary to bombard the place.

Capitulation of Sedan, and Surrender of the Army and Fortress.

The capitulation was arranged on the evening of the 2d of September.

The captured army was to be interned on the peninsula north-west of Sedan, formed by a loop of the river and closed by the canal on the south, until they could be sent in successive detachments to Germany. To connect this island with Sedan and Donchery, the 1st Pioneer company of the XI. Army Corps constructed three pontoon bridges over the Meuse on the 2d and 3d of September.

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General Schulz, commander of the Engineers of the Third Army, just returned from Strasburg, was named president of a commission which was to take over the fortress and captured stores. The work of the commission was not completed till the 10th of September. The booty consisted of 419 field-guns and mitrailleuses, 174 garrison guns, 1850 cwt. of powder, 1072 waggons of different sorts, about 65,000 rifles, and 6000 serviceable horses.

Captain Kuester was appointed Commanding Engineer, and he immediately took all measures needed for arming the fortress. Owing to its exposed position and the small number of troops available for a garrison, it appeared necessary to make the place defensible as soon as possible.

It was proved later that a surprise was often contemplated by the French, with a view to recovering the large number of guns, etc., which had been left in Sedan.

CHAPTER VII.

ADVANCE OF THE THIRD ARMY AND OF THE ARMY OF THE MEUSE UP TO THE INVESTMENT OF PARIS.

IMMEDIATELY after the capitulation of Sedan both armies began their march on Paris. The vi. Army Corps and 5th Cavalry Division formed the Advanced Guard, and reached Rheims on the 4th of September. In the meantime the Guard Corps made an attempt on the fortress of Montmédy, situated about 23 miles from Sedan.

This detachment, which was placed under the command of Major-General Prince Hohenlohe, consisted of the 2d Brigade of Infantry of the Guards, six squadrons of Uhlans, the Artillery of the 1st Division of Infantry of the Guards, with the Corps Artillery (altogether ten batteries), and the 1st Company of Pioneers of the Guard, with the Light Field Bridge-Train (Captain von Bock). The detachment was ordered to be at Thonelle les Près, near Montmédy, at 6 A.M. on the 5th of September, and a reconnaissance was to be made before then.

Accordingly these troops moved on Montmédy during the night of the 4th of September. The commanding officer, accompanied by his staff-officer of Engineers, Lieutenant-Colonel von Wangenheim, and the senior Artillery officers, having personally reconnoitred the fortress, a portion of the artillery was placed on the heights north-west and west of Tonne les Près, and the rest northward of Montmédy. They were covered by four Infantry battalions, and the flanks were protected by Cavalry. Two battalions and the Pioneer company remained in reserve at Thonelle. The fortress fired a few shots at the Uhlans early in the morning, but beyond this the garrison was quite quiet.

The German batteries opened at about 10.30 A.M., and several

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fires were shortly after seen in the upper town, and seemed to spread. At 11.30 A.M. a summons to surrender was sent to the Commandant, and, as no answer was returned, firing was resumed at 1 P.M. The enemy answered briskly with a few guns, but without causing any loss to speak of. As the enemy showed no signs of capitulating by 2 P.M., although several new fires had been started in the town, the firing was stopped, and the whole detachment retired in a westerly direction.*

The Army of the Meuse reached the line through Chaumont, Porcieu, and Rethel, on the 8th of September, and the Third Army was on this day already so far ahead that it was ordered to continue its advance by shorter marches. The Third Army was directed to move with its right wing resting on the Marne, while the left wing of the Army of the Meuse marched along the wide road on the right bank of that river.

The 6th Cavalry Division had summoned the Citadel of Laon to surrender on the 8th of September. It did so on the 9th, the Rifle Battalion No. 4 and two batteries having arrived to reinforce the Cavalry. While the troops were taking over the town the powder-magazine of the citadel exploded, causing us considerable loss.† It has as yet been impossible to ascertain whether the explosion was the result of carelessness or treachery. As a consequence of this misfortune, general orders were issued directing that, in future, whenever a French fortress should have surrendered, the powder-magazines were to be occupied by detachments of Pioneers and Artillerymen, and the mines examined by Engineer officers before the entry of the troops.

The IV. Army Corps had received directions to take up a position against the fortress of Soissons, so as to give due force to a summons to surrender. For this purpose the 7th Infantry Division crossed the Aisne on a pontoon bridge built by the 1st Field-Pioneer Company, and at the same time Lieutenant-Colonel von

* Further information about Montmédy will be found in Part III. After the fall of the fortress in December 1871 the French officers stated that Montmédy must have surrendered on this occasion had the bombardment continued, on account of the very exposed condition of the magazines.

† It is of course possible that the explosion was accidental. When several other French fortresses were given over large quantities of explosives and rifle-cartridges were found in open public places. Ammunition stores and shell-filling rooms, such as are universal in Germany, are, as a rule, not provided in French fortresses, and an accident may therefore easily occur. It is considered that the explosion of the powder-magazine in Fort Clappeville, at Metz, in November 1871, was probably due to some such cause.

Eltester, staff-officer of Engineers, made a special reconnaissance of the southern fronts of the fortress.

It appeared that the fortress was perfectly secure against any sudden attack, in consequence of the flooded condition of the Aisne, and therefore the 7th Division retired, the enemy having refused to capitulate.

On the 15th of September, no event of importance having occurred in the meantime, the armies occupied the country between the Oise and the Seine, the advanced guard being pushed forward to within 27 miles of Paris, with its flanks covered by the Cavalry Divisions. The two Corps which had remained behind to guard the prisoners taken at Sedan (the XI. and II. Bavarian), reached Rheims and Epernay. The Würtemberg Division, which for some time past had occupied Rheims, arrived on this day at Château Thierry.

Here and there the Germans found that the bridges on their line of march had been destroyed, but no delay was caused thereby, as the communications were speedily made good.

Thus the Pioneers of the VI. Corps built on the 8th and 11th of September several bridges over the Marne, at Sauvigny, and Azy, and on the 13th and 14th of September over the Seine and the Ourcq Canal at Trilport and Meaux. On the 15th of September the Marne was also bridged at Lagny, and some of the Paris water-works were destroyed.

On the 15th of September the necessary orders were issued from chief headquarters for the investment of Paris. The Army of the Meuse was to occupy the ground between the Seine and Marne, to the north and north-east of Paris. The Third Army was to advance to the left bank of the Marne and Seine, and to push its left wing more westward on the arrival of the corps still on the line of march. The Cavalry Division was, for the time being, to complete the investment on the west.

To carry out these orders the following distribution of the forces was made :—

The Army of the Meuse.

The 6th Cavalry Division was posted at Chevreuse, south-west of Versailles, with its left wing on the railway from Dreux to Versailles. The right wing of the 5th Cavalry Division was to feel the 6th Cavalry Division, and its left to rest on the Seine at Poissy.

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The IV. Army Corps occupied St. Brise, about $4\frac{1}{2}$ miles north of St. Denis, with outposts at Argentueil, Deuil, Montmagny, and Sarcelles. A Cavalry Brigade was attached to the corps for the purpose of watching the Seine below Argentueil, and to keep up communication with the 5th Cavalry Division.

The Guard Corps was stationed at Boissy, about 7 miles north-east of St. Denis, its outpost occupying the line Arnouville, Garges, le Blanc Mesnil, and Aulnay les Bondy.

The XII. Army Corps at Claye, with outposts at Servan, Livry, Clichy, Monfermeil, and Chelles.

The Third Army.

The 2d Cavalry Division was posted at Sachay, south-west of Versailles, keeping up communication with the 5th Cavalry Division.

The V. Army Corps at Versailles, with outposts opposite St. Cloud and Sèvres; the outposts extended from Croissy on the Seine to the park at Meudon, joining the IV. Corps on the left.

The II. Bavarian Corps at Longjumeau, with outposts from the park of Meudon to Bièvre at L'Hay.

The VI. Army Corps was to complete the circle of investment from L'Hay to the Seine, and for the time being to leave a brigade on the right bank of the Seine to occupy the ground between the Seine and the Marne. Later on this section was taken by the Würtemberg Division, outposts being on the line from Noissy to Ormesson.

Finally, the 4th Cavalry Division was to cross the Seine at Fontainebleau, and take up a position facing towards the Loire.

The investment was completed in accordance with these orders on the 19th of September, after the enemy had quitted the positions northward of St. Denis, and the heights of Chatillon, Meudon, Sèvres, and St. Cloud, and the works they had thrown up, though not without having made a strong resistance at some points.

The most severe fight occurred on the 19th of September at Petit Bicêtre, where the 9th Division was attacked in flank by superior numbers. However, the 3d Bavarian Infantry Division came up quickly to reinforce them. The 5th Bavarian Engineer company shared in the fight, and destroyed the barricades and abattis in the face of the enemy. When the enemy had been forced back through

Sceaux and Plessis-Piquet, the company, together with a detachment of the 4th Engineer company, were ordered to construct a fortified position behind Plessis-Piquet, and then to put a redoubt at Moulin la Tour into a state of defence, that work having previously been captured by the Bavarians.

Accordingly this important though unfinished work was so far perfected during the night between the 19th and 20th of September, by closing the gorge, making loopholes, etc., that by the morning of the 20th it constituted a most valuable *point d'appui* for the investing force.

The Cavalry Divisions told off to invest the west side of Paris could not cross the Seine till the 20th of September, as the Oise had first to be crossed at Pontoise, where it is about 100 metres wide. The 1st Field Pioneer company of the IV. Army Corps, which had been attached to the divisions, had with it only a portion of the Pontoon train,* and consequently it was necessary to dismantle the bridge over the Oise after the two Cavalry Divisions had crossed at mid-day on the 19th, and to relay it over the Seine at Triel, over 6 miles south-west of Pontoise, during the night of the 19th of September. This bridge was about 150 metres long, and was finished at 3 A.M. on the 20th of September, and the Cavalry Divisions began to cross at daybreak—some detachments having been passed over in rafts on the afternoon of the 19th. These rafts were built by the Pioneer detachment which had been attached to the Cavalry, and who at the same time made preparations for laying the bridge.

The Third Army crossed the Seine at Villeneuve and Corbeil, where three military bridges had been constructed on the 17th and 18th to replace the permanent bridges which had been destroyed by the enemy.

The V. Corps crossed on the 17th of September at Villeneuve, in the face of the enemy, who had occupied the left bank of the river.

To cover the construction of the bridges two battalions of Infantry and a detachment of Cavalry was first put across in a ferry-boat and in pontoons, who cleared the left bank of the enemy. The heights of Limeil were also occupied by a mixed brigade, who repelled the attack made by the enemy in the afternoon.

* The Army of the Meuse had altogether only two Pontoon-trains, as the Saxon one had been left behind at Metz.

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During this attack the three Pioneer companies commenced the construction of the bridge, which was finished between 2 and 3.30 P.M. The working party was only disturbed by a few solitary shots, which caused little loss. The bridge was about 140 metres long, and was crossed about 3.30 P.M. by the 2d Cavalry Division, and then by the v. Army Corps. The passage was completed by the morning of the 18th of September. The bridge was dismantled on the 19th of September, and relaid on the following day at Les Tanneries, below Paris, so that the communication was made good between the Third Army and the Army of the Meuse.

The vi. Army Corps made use of the pontoon bridge of the v. Army Corps to cross on the 18th and 19th of September, constructing, in the meantime, a second bridge with their own Pontoon train. The bridge was built by the 3d Field Pioneer company of the v. Army Corps in the course of the 18th of September. In addition, a rope ferry, with the necessary landing-stages, was established at Choisy-le-Roi by the 1st Field Pioneer company of the ix. Army Corps on the following day.

The ii. Bavarian Corps, which was ordered to Corbeil, found the bridge there also destroyed. During the night of the 16th of September a detachment of the 6th Field Engineer company passed the battalions of the Advanced Guard across the Seine, and at 7 o'clock in the morning of the 17th of September they commenced the bridge, which was completed by the 2d Field Engineer Division. This bridge had almost the same length as that constructed by the v. Army Corps, and was completed in two hours and a quarter. The ii. Bavarian Corps began to cross at 9.30 A.M., while, at the same time, battalions of Infantry were ferried over by boats and pontoons.

The bridge was afterwards dismantled and replaced by two trestle-bridges hastily constructed, one of which was laid by the 2d Bavarian Field Engineer Division, the other by requisition on the town of Corbeil.

It remains to be mentioned that the Würtemberg Field Division constructed a bridge across the Marne below Lagny on the 18th of September. This, however, was ordered to be dismantled on the afternoon of the following day, and re-constructed at Gourney in the evening, the Würtemberg Division having got orders to cross over to the right bank of the Marne with the view of supporting the army of the Meuse. This bridge was soon afterwards

replaced by a trestle-bridge about 72 metres long, constructed from unprepared materials by the Würtemburg Pioneers.

Another bridge across the Marne was constructed on the 20th of September at Pomponne by the 3d Pioneer company of the XII. Army Corps.

The operation of the investment had thus been but slightly retarded by the demolition of nearly all the bridges on the main roads ; indeed, this measure was a failure, as owing to it the enemy was unable to defend the positions in advance, especially the lines of the rivers.

On the other hand, the complete demolition of the railroads had made it very difficult to maintain the communications in rear of the investing army, although the Field Railway detachments succeeded in making the lines passable again in a comparatively short time. Had, however, the barrier fortresses, Toul, Vitry, and Soissons, held out for a few months, the army of investment would have been in a very critical position, as the protection of the trains bringing up supplies, siege materials, etc., would have been exceedingly difficult, if not altogether impossible.

Never, in the whole course of the war, did the great value of effective barrier fortresses exhibit itself so prominently as at this time. The demolition of the great railway works, especially of the tunnels, could only be serviceable for the defence of the country in case of its having been decided beforehand that the offensive could not be resumed again during the whole course of the campaign.



PART II.

INVESTMENT OF METZ.*

CHAPTER I.

GENERAL DESCRIPTION OF THE POSITION AND GROUND.

THE ground about Metz is divided by the Moselle into two main sections. The fortress proper lies on the right bank of the Moselle, which constitutes the east section, while the left bank, independently of the detached forts, is only defended by a bridge-head.

On the south of Metz the Moselle is for the most part bounded by heights lying close to the river, so that it forms here only a narrow valley. At Ars the line of hills begins to take another direction, the main ridge on the right bank running generally to the east. At Charly it turns again towards the north, and then sweeping by the town close to its east front, trends abruptly towards the river. On the left bank the heights follow generally the course of the Moselle. Only on the north-west of Metz do they leave the river, so that here a wide and richly covered plain is formed.

Generally the heights of the left bank command those of the right, and while these latter fall gradually towards Metz on their southern portions, those on the left bank are for the most part steep and abrupt, so as only to permit of the movements of large masses of troops along the made roads.

This line of heights is divided by a row of deeply-cut valleys into

* Some of the information in this part has been supplied to the author by Captain Paulus of the Prussian Corps of Engineers, who is authorized to publish a special account of the Investment of Metz.

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several plateaux, which are, for the most part, passable on the upper portions, but frequently have very steep slopes. They all meet together in the district about Amanvillers, and may be distinguished as follows :—

(1.) The plateau from Verneville to Gravelotte, between the Gorze stream, which flows southward, and the Mance stream, which flows first south and then eastward. On the north of this plateau is the Bois de Génivaux, on the south the Bois des Ognons.

(2.) The plateau from Amanvillers to Point-du-Jour, between the valleys of the Mance and Chatel, which is covered on the south by the Bois de Vaux, with approaches at Vaux and Rozérieulles.

(3.) The plateau from Amanvillers to Plappeville, between the valley of Châtel and the ravine of Saulny, sweeping south-east, and covered by the woods of Saulny and Châtel on the northern portions. On the south end, connected only by a ridge with the rest of the plateau, lies the steep isolated height of St. Quentin, 350 metres above the sea-level. (The level of the Moselle in time of floods is 170 metres, of Amanvillers 336, of Plappeville 346 metres.) Mont St. Quentin gives a view of the whole town, and particularly of the southern works of the fortifications.

(4.) The plateau St. Privat La Montagne, falling on the north towards the Orne, and east towards the Moselle, with several sharply-defined salient spurs. The most important of these was the Horimont (341 metres) on the south side of Marange, as from thence the whole of the valley, as well as the northern half of the right bank of the Moselle, could be observed.

The possession of the villages of Amanvillers and St. Privat La Montagne, the prize of the victory of the 18th August, had the effect, therefore, of restricting the French to the plateau of Amanvillers-Plappeville, which is directly accessible from Metz.

On the right bank of the Moselle, the Seille, which comes from the south and enters the Moselle on the north side of Metz, divides the ground into two parts. On the left bank of the Seille, on the northern part of the line of heights, the isolated steep hill St. Blaize (350 m.) offers an excellent observatory.

Besides this, the height of Montigny should be mentioned, which forms a narrow plateau about 25 metres above the Moselle. The Saarbrück railway crosses it in a cutting from 5 to 6 metres deep; further on the line crosses the valley of the Seille by an embankment 10 metres high. The Strasburg line also runs along a ravine

to the great railway workshops, and then crosses the plain of the Moselle by means of high embankments and bridges. The section of ground on the right bank of the Seille is again divided by smaller ravines opening to the westward, among which the Chenau and the Vallières may be specially mentioned. Hill and dale alternate in perpetual succession, the hills becoming more elevated further north.

The highest points are Queueleu (225 m.), a height on the north of Pouilly (230 m.), Mercy-le-haut (246 m.), Aubigny (249 m.), St. Barbe (300 m.), and the height of St. Julien (250 m.).

The heights of the left bank are, as already mentioned, for the greater part covered with wood. The open parts of the plateaux are only partially cultivated, and the soil consists of a thin layer of mould, below which rock is soon found at a depth of from 30 to 50 centimetres. The southern and eastern slopes are covered with vineyards.

The right bank, on the other hand, shows a remarkably rich state of cultivation ; on all sides residences are to be seen, both large and small, which, for the most part, have an air of opulence about them, and woods alternate with arable land and vineyards.

The ground is at the right season of the year passable for troops of all arms, whereas with continued wet the viscous clay will only allow Cavalry or Artillery to move along the roads, and even Infantry can only get on with difficulty outside the tracks. The network of roads, however, on this side stretches far away, and the communal roads, as well as the transverse communications between the main roads, were, at least in the beginning of the investment, everywhere in good condition. The main communications converging towards Metz are the high-roads of Nancy, Nomény, and Strasburg (the road from Rémilly enters the latter at Grigy), also the high-roads of Saarbrück and Saarlouis, which unite at the farms of Bellecroix, and finally the high-road of Bouzonville. Connected with these, on the left bank are the roads from Thionville into which the high-road from Briey enters at Woippy, following the ravine of Saulny ; also the two high-roads from Verdun past Doncourt and Vionville after their junction at Gravelotte, and lastly the road from Novéant.

Inside the town two permanent bridges span the Moselle. In addition to these the following may be mentioned : a suspension-bridge north of Metz, inside the fortifications ; a railway-bridge

south of Metz, at Longeville, which was blown up, although situated within the French position; also the railway-bridge at Ars, as well as a masonry bridge in course of construction.

With reference to the waters of the Moselle, it may be noted that at medium water-level, with a breadth from 150 to 250 metres, it has only about 0·7 to 1 metre in depth, although after continuous rain it will often rise rapidly. The highest water-level is about 3·25 metres above the medium. The Moselle divides itself at Montigny into the old Moselle and the principal branch. The latter is navigable, and after taking in the Seille unites below the town and the island Chambière with the old Moselle. The islands of Symphorien and Saulcy are formed above the town by its various branches. At low-water level the Moselle can be forded at several places; for instance, at Montigny, Argancy, Chateau-Meaucourt, Blettange, and Uckange. The river-bed is gravelly and firm. The banks on an average are from 1 to 2 metres above the medium water-level.

The Seille has an average breadth of 25 to 35 metres, and a relatively considerable depth, being not less than from 2 to 3 metres. One arm of the Seille flows through the town, another through the main ditch. The river has only a slight fall, low banks, with marshy bed, and after heavy rain it often overflows the neighbouring fields. Several bridges lead across this river into the fortifications; outside which there is the railway bridge on the north of Magny, besides the bridges at Marny, at the mill west of Fleury, and at Silegny. The masonry bridge at Magny was blown up, and another was temporarily constructed in place of it at the foot of the glacis of the fortress. Besides these communications the lines of the railway from Saarbrück and Nancy, (the latter of which crosses from the left to the right bank of the Moselle at Ars), unite on the south side of Metz in a main station. From this main station the line from Metz to Thionville starts with a great sweep around Metz, reaching the left bank at Longeville. The line from Metz to Verdun, in course of construction, was to join this one passing through the valley of Chatel and gaining the top of the plateau at Amanvillers. The completion of this line would have added considerably to the importance of Metz as the central point of the French system of communication.

From this description of the ground the offensive importance of the fortress, in an aggressive war against Germany, is sufficiently

shown, as masses of troops assembled on the right bank of the Moselle, under cover of its guns, could break out simultaneously, whereas the fortress in its present relation to the west is almost exclusively restricted to purely defensive action.

GENERAL DESCRIPTION OF THE FORTIFICATIONS.

The Town and Advanced Works.

The fortifications begin below the town with an old rampart, behind which lies the retrenchment of Guise, having high escarp-walls and wet ditches. A cavalier flanks the fortification of the island of Chambières, and commands the low grounds of the Moselle and Vallières. The old town wall stops at Ravelin No. 21, and from thence a revetted rampart of Vauban's construction, with five irregular bastioned fronts, constitutes the principal enceinte. The main ditches can, for the most part, be filled with water. The whole front may be described as absolutely secure against sudden assault, although the high escarp walls may be partly breached from a great distance.

Six gates afford communication with the ground outside. The railway station is in front of the Porte Mazelle, and is covered by a lunette. The west front is of quite recent origin, and in the year 1870 was still in course of construction. It has flat bastions, casemates under the curtains, and two stories of large vaults under the centre bastion. The masonry was supposed to be covered by a glacis.

In advance of the west front is the bridge-head called Fort Moselle (a double crown-work built by Cormontaigne), enclosing only military establishments. Two gates communicate with the ground outside.

In advance of the east front on the edge of the plateau, which falls abruptly towards the town, stands the double crown-work of Bellecroix, also built by Cormontaigne. This great fort, which is everywhere secure against escalade, has an extensive system of counter-mines, and a considerable development of front, but only limited covered spaces. It was formerly considered by the French as the main point of attack, and it is undoubted that the fall of this work would be decisive in giving possession of the fortress.

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Besides the two double crown-works already mentioned, there are the following works, all nearly at the foot of the glacis :—

In advance of the north front, the lunettes Miollis and Chambière, commanding the north plain of the Moselle ; a work on the island of Saulcy ; in advance of the south front, and flanking it, a horn-work built by Vauban ; in front of this horn-work the lunettes Rogniat and d'Arçon, and farther east the railway station lunette. Then come the redoubt Pâté, commanding the Seille valley, and the lunettes Chenau (also called Gisors) to overlook the valley of Chenebau.

The Moselle can be dammed by a sluice-gate inside the town, and at the same time utilized to supply the ditches of Fort Moselle, as well as of the fronts of St. Vincent and Chambières. The ditches of the east and south fronts can be filled from the Seille when required.

After the introduction of rifled guns the whole of the works were defiladed anew, for which purpose a great number of traverses and bonnettes were constructed ; also, in some particularly important bastions, blindages were built. In the case of the bastions of Fort Moselle, counter-guards were raised to prevent the masonry being breached on the prolongation of the ditches of the ravelins.

In the same way, at Fort Bellecroix the cover of the masonry of the escarp was improved ; and the bomb-proof space was increased by the construction of shelter-places in Fort Moselle and in the advanced lunettes of Fort Bellecroix.* In order to get a better view of the ground in front, the construction of a high cavalier had been commenced in this fort, and, in addition, a little work had been pushed forward, so as to obtain a better command of the valley of Vallières.

In considering the defences of Metz it must be borne in mind that immediately before the south front the populous suburbs of Montigny and Le Sablon had sprung up ; that the railway to the Nancy station had, in an incomprehensible manner, been suffered to be led nearly parallel to the south front through a deep cutting not looked into by the fortress at any point, although little more than

* As these measures were not nearly sufficient, it was decided at the beginning of the investment to convert the Porte Serpenoise and Porte de Secours (leading into the horn-work) into quarters, by the construction of intermediate floors, and a row of bomb-proof blindages were built underneath, in wood and iron, behind the rampart.

1000 metres from it; and that joining this cutting the railway from Thionville crossed the Moselle valley on a high embankment—all circumstances which the assailant could scarcely desire to have been more favourable—and we have a picture of the state of the supposed invincible fortress of Metz up to 1866.

After the great events of that year preparations were made for the construction of more advanced forts, under the direction of Marshal Niel, and according to his ideas, which were intended to protect the town against every attack, and to form a great entrenched camp.*

First of all, in 1868 the construction of four forts was commenced, viz. :—

On the left bank of the Moselle.

FORT ST. QUENTIN, to command the south plain of the Moselle, including the opening at Ars, the roads towards Verdun, and the plateau Amanvillers-Point-du-Jour, and

FORT PLAPPEVILLE, to command the plateaux of Amanvillers and Point-du-Jour, and of Amanvillers and Plappeville, the north plain of the Moselle, and the roads towards Briey and Thionville.

On the right bank of the Moselle.

FORT ST. JULIEN, to command the north plain of the Moselle, the plateau of St. Barbe, and the roads of Bouzonville, Saarlouis, and Saarbrück, and

FORT QUEULEU, for the defence of the roads from Strasburg and Nomény, as well as of the plateau of St. Privat.

Besides these, a fort (St. Eloy) in the plain on the north of Metz, and Fort St. Privat, on the south, were to be built later. Indeed, the last was commenced as an earth-work in the spring of 1870, at the special suggestion of General Frossard.

* In order to protect the town from a bombardment, and, in accordance with the strategical importance of Metz, the new works should have been pushed farther forward, so as to be about $4\frac{1}{2}$ miles from the centre of the town. It is however to be supposed that the French school of Engineers could not resolve to give up their old traditions altogether, according to which the defence of the rampart, step by step, is the critical period of the siege. Marshal Niel therefore struck out a middle course, greatly to the detriment of the defence. The investment of Metz, in the year 1870, could hardly have been carried out with the then available forces, if the entrenched camp had had a greater extension, and if the heights of Point-du-Jour, Amanvillers, Poix, Colombey, Pouilly, and St. Blaise had been fortified.

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The four above-named forts were built on the modified bastioned trace, but avoiding as far as possible low flank defences to the ditches. The fronts being generally short, the construction of tenailles became necessary, which served at the same time to cover the masonry of the curtains. Ravelins were not built. In the ditches the counterscarps were revetted or hewn out of the rock, and the escarpments were mere face-work demi-revetments surmounted by parapet walls. The *escarp-en-décharge* was also largely employed, but owing chiefly to the unfavourable condition of the ground the masonry did not stand everywhere under the loading it had afterwards to carry, so that even before the occupation it had fallen in places. The ditches were made narrow and deep so as to cover the masonry of the escarpments. The principal position for artillery was on a cavalier, which was considerably higher than the *enceinte*, running parallel to the line of front. Below the cavalier was a two-storied casemated barrack which communicated through casemated traverses directly with the rampart of the cavalier, and through posterns with the enveloping *enceinte*. The barrack accommodation that was wanting was supplied by the casemates *en décharge* under the gorge wall, which communicated with the interior by several posterns. Large main magazines were provided in sufficient number, but on the other hand, expense magazines, shell-stores, and shell loading-places were wanting.

The forts varied considerably in size, but even the smallest (St. Quentin) had a greater number of guns than most of the Prussian forts hitherto built. The largest fort (Queueuleu) was intended for 112 guns.

The forts furthest advanced in construction were St. Quentin and Plappeville, which might be called quite secure from escalade, as their ditches were cut out of the rock. The escarpments of Fort St. Julien and Queueuleu were nearly completed, but their gorges were unfinished, and the counterscarps were as yet only earthen slopes. The armament was also very incomplete when the German troops appeared before Metz.

Perhaps a *coup-de-main* against some of the east forts might have succeeded had two or three Army Corps been available for this purpose. At all events, the departure of the Army of the Rhine on the 15th and 16th of August would have been stopped by such an attempt. Had the German troops succeeded in maintaining the

forts, and had the town and camps been then bombarded with all the available field-artillery, perhaps a catastrophe similar to that of Sedan might soon have been brought about. Yet, if we take the conditions as they really were on the 18th of August, we see that any effective bombardment with field-artillery was prevented by the forts, and that the only choice left was between a close investment, assisted by a bombardment as soon as a siege-train could be brought up, and a formal attack. The latter might have been directed against either of the following points :—

(1.) Against Queueleu, the most strongly armed work, in attacking which the Saarbrück railway, leading to the rear of the attacking position, could render good service. The attack might have rested its left flank on the Seille, and would have suffered little from the other works.

(2.) Against St. Julien, resting the right flank on the Moselle, with good communications in rear, which could be improved by the completion of the railway from Courcelles to Les Etangs, already in course of construction.

(3.) Against Plappeville and St. Quentin. Here the attack would have had to be made with reversed strategical front against the works furthest advanced towards completion, with very unfavourable conditions of soil, and very difficult ground to advance over for the assault. There would only have been a railway as far as the right flank of the attack at Ars and Novéant, from whence the artillery would have had to be dragged up the heights.

Setting aside the difficulties of making any formal attack with so strong an army enclosed in the fortress, the attack on Queueleu would, to all appearance, have led the soonest to a conclusion, as with the capture of this fort the condition above stated would have been complied with, which was to make practicable an effective bombardment of the town and camping grounds.

A bombardment with siege-guns, without a formal attack, would have had but small prospect of success, as the batteries must have been placed very far from the forts, so as not to expose them to destruction in the event of strong sorties. Besides, as the area of the object aimed at was very extensive, any success could only be hoped for by employing a great number of guns, and expending large quantities of ammunition.

In any case, to bring up the siege-train demanded time, and this time was invaluable to the defence for strengthening and arming

the works. Under these circumstances, and as the supply of provisions was only supposed to be sufficient for at most three or four weeks, a close blockade was decided on, which, had this supposition been correct, would have led more rapidly to the end in view than a formal siege.

Works thrown up by the French, and Positions occupied by the Army of the Rhine.

After this explanation, let us return to the consideration of those works which, in addition to the permanent forts, were undoubtedly in existence at the close of the investment ; and, for the most part, were constructed during its progress.

As the most important, the following may be enumerated :—

(1.) Between the forts of Plappeville and St. Julien there were batteries on the spur called Coupillon ; also, westward of Le Sansonnet, on the height west of Woippy, in the plain of Maison-Rouge, and in front of St. Eloy and La Grange-aux-Dames ; and lastly, the Chatillon field-work on the right bank of the Moselle, north-west of Fort Julien (west of the road to Bouzonville). These were all intended to keep the north plain of the Moselle under fire.

(2.) Between Fort St. Julien and Queuleu the arming of an intermediate work, Fort Les Bottes (or Les Bordes), on the road to Saarbrück, had been commenced. It was armed with 14 guns, having a demi-redoubt (*Halb-Redoute*), with timber caponiers in the centre of the front, the right flank flanked by a kind of demi-caponier, and the gorge by a redan ; with wire entanglements on the glacis and counterscarp and palisading on the escarp. In the interior there was a masonry casemated barrack, not completed (the earth-covering to which served as cavalier), with two powder-magazines and a timber guard-house (*Wach-Blockhaus*). On the left lay a battery, and besides this, the farm of Grimont was fortified so as to make a very strong advanced post.

(3.) Between Forts Queuleu and St. Quentin was the quadrilateral bastioned Fort St. Privat. As owing to its incomplete state and its exposed position this fort could not be armed, and would have been difficult to hold against an energetic attack, it was supplemented by three provisional works, viz., the field-work La Horgue, north of the homestead of that name (the left flank resting on the

Saarbrück railway), and the field-work Des Ateliers, south of Montigny, in front of the railway cutting. Both these were in a well advanced state at the time of the surrender, being palisaded in the ditches and at the gorge, and provided with casemated traverses and powder-magazine in timber. Lastly, there was the field-work De la Plaine, in the plain between the railway from Nancy and the Moselle, which was much behind-hand in construction. These main-posts were mostly connected with each other and the rear by one or more lines of rifle-pits ; and the plateau of St. Quentin was separated by a retrenchment.

Thus the circumference occupied on the French side may be indicated by the following names :—

Moulins les Metz, St. Ruffine, Lessy, Lorry, Woippy, St. Eloy, Chatillon, Grimont, Nouilly, Mey, Vautoux, Ferme Bellecroix, Borny, Grigy, La Haute-Bevoy, La Grange-Mercier, La Grange-aux-Ormes, Bradin, and La Maison Rouge.

On the 19th of August the following troops were encamped on the ground, viz. :—

The II. Corps (Frossard) at Longeville les Metz.

The III. Corps (Le Bœuf) at Clappeville.

The IV. Corps (L'Admirault) at Tignomont and Sansonnet.

The VI. Corps (Canrobert) in the plain near Woippy.

The Guards on the east crest of St. Quentin.

No. 3 Reserve Division of Cavalry (Forton) at Chambière.

On the 22d of August the III. Corps was moved out of this position to the right bank of the Moselle, and on the 26th was joined by the II. Corps. The ground between the left bank of the Seille and the Moselle was apportioned to the latter. The other Corps maintained their positions to the end of the investment.

CHAPTER II.

GENERAL DESCRIPTION OF THE INVESTMENT.

LET us now present a view of the position of the German army on the evening of the 18th of August.

The I. Army Corps and the 3d Division of Cavalry were on the ground vacated by the French troops on the right bank of the Moselle, in order to observe the enemy and to cover the railway from Courcelles to Saarbrück, while the whole of the Second Army, as well as the VII. and VIII. Army Corps, had crossed the Moselle, in order to cut off from the Army of the Rhine the last line of retreat across Briey.

This problem was splendidly solved by the battle of Gravelotte, and the villages of Vernéville, Amanvillers, St. Privat le Montagne, as well as the farm of St. Hubert, further south, fell into the hands of the Germans. The farms of Montigny, La Grange, Leipsic, Moscow, and Point-du-Jour remained in possession of the French ; but in the night, and in the early morning of the 19th, they were evacuated by order of Marshal Bazaine.

The German troops bivouacked on the night of the 18th of August in the positions held after the battle as follows :—

The XII. Corps, the Guards, and the 20th Division at St. Privat ; the 19th Division more to the rear, at Batilly, westward of the Bois de la Cusse ; the 25th Division at Amanvillers ; the 18th Division in the Genivaux Wood ; the III. Army Corps further on, near Vernéville ; the VIII. Corps, one division of the II. Corps, and a brigade of the VII. Corps, at Gravelotte ; the three other brigades of this latter Corps being in the woods of Vaux and Jussy. Lastly, the 3d Division of the II. Corps were posted in advance of Gravelotte, on the other side of the Mance stream, opposite to Point-du-Jour, near St. Hubert.

During the 18th of August two squadrons of the XII. Corps were moved, by way of Roncourt, into the Moselle valley, north of Metz, in order to cut off the communication with Thionville. These squadrons found the forest roads much impeded by abattis, so that it was only in the evening, at a quarter to 8 o'clock, that they succeeded in destroying the railroad in the neighbourhood of Richemont, and in cutting the telegraph-wires.

Thus, on the evening of the 18th of August, we see the circle of investment about Metz to all intents and purposes closed, although still weak at some points, especially in the east ; but sufficiently strong against an army which, having been beaten in three battles, would require a few days for re-organization.

On the morning of the 19th of August the II. Corps reported that the farms of Leispic, Moscow, and Pont-du-Jour were abandoned, and extended itself, therefore, on the plateau of Amanvillers and Pont-du-Jour towards the left, resting its right wing on the VII. Corps in the wood of Vaux.

At half-past 7 o'clock on the same morning, the XII. Army Corps detached a brigade of Infantry, as well as the 3d Company of Pioneers, towards Marange and Maizières, with orders to cut the railway from Thionville. The roads leading through the wood of Marange were, however, completely barricaded, so that the brigade could only arrive at its destination at about mid-day. The Pioneers began at once with a thorough demolition of the line, so as to make sure that a train* coming from Thionville would be upset.

At 5 o'clock in the afternoon of the 19th of August the brigade began their retreat towards St. Privat, after the arrival of the X. Army Corps for their relief.

First Period of the Investment.

The actual Army of Investment was formed on the 19th of August out of parts of the First and Second Armies, together with the lately arrived 3d Division of Reserve (*Kummer*),† and the com-

* The railway demolished by the Saxon Cavalry on the evening of the 18th of August (near Richemont) must, according to this, have been already restored.

† The 3d Division of the Reserve (18 battalions of Infantry, 20 squadrons, 36 guns, and 1 company of Pioneers), was first formed on the 10th of August, and moved from Kaiserslautern and Mayence towards Saarlouis. On the 13th of August the division got the order for the investment of Metz, and to prepare for the siege of this fortress by a preliminary blockade ; also to mask Thionville. In any case, however, they were to prevent expeditions from Metz being undertaken against the communications of the armies in

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mand-in-chief was given to Prince Frederick Charles. The Army of Investment consisted of the I., II., III., VII., VIII., IX., and X. Army Corps, the 3d Division of Reserve, and the 1st and 3d Divisions of Cavalry. In addition, four Pioneer companies of the Guards and the XII. Corps, with two Pontoon trains, were told off to the army.

On the 20th of August the necessary orders were sent by telegraph to move up the XIII. Army Corps (17th Division of Infantry and 2d Division of Landwehr), hitherto under the government of the Coast District. On the same day a special detachment was formed for the blockade of Thionville, which was to consist of the 65th Infantry regiment of the line, two regiments of Landwehr, one regiment of Cavalry, and one battery, under the command of General von Bothmer. It was however left optional to the Commander-in-Chief, in case he considered Thionville to be sufficiently masked, to make use of this detachment to reinforce the investing Army on the right bank of the Moselle above Metz.

In the meantime, until further orders, Thionville was only under observation by two regiments of Cavalry of the 3d Division of Reserve.

On the 20th of August the General commanding mooted the question as to the feasibility of reinforcing the Artillery for the sake of sparing the Infantry, and this proposition was at once met by making over to him 50 twelve-pounders, and 5 companies of Garrison Artillery. On the other hand, an application for the transport of the largest possible number of tents was refused to be authorized, because the preparation and carriage of these tents would presumably have taken too much time, and have considerably embarrassed the lines of railway.

The following programme of arrangements for the investing Army was issued on the evening of the 19th of August :—

The investing troops on the right bank of the Moselle, consisting of the I. Army Corps, the 3d Division of Reserve, and the 3d Division of Cavalry, have the following task before them :—

i. To shut up the fortress in such a manner as to completely cut off all communication with the outer world by means of a line of outposts, giving the Cavalry a great part to play.

advance. At the same time the First Army was directed, if it should cross the Moselle above Metz, to leave a division on the right bank until the arrival of the 3d Division of the Reserve.

2. So to distribute the troops that they may be concentrated in a certain selected position, on the right bank of the Moselle, in good time to meet an attempt on the part of the enemy to break out towards the north. The investing troops on the left bank would have to co-operate vigorously should such an attempt be made by the enemy. With this object it is proposed to construct a bridge at Hauconcourt, protected by field-works.

3. The terminal point of our railway communication towards Germany, and our first Magazine depot, is the railway station at Remilly. To secure this, the I. Corps has to choose a position in which it will be at once supported on both flanks by the other corps nearest to it.

4. Should the whole power of the enemy be directed against the investing troops on the right of the Moselle, for an extensive operation in another direction, they are to evade the shock, so as to avoid a serious action against overpowering forces.

As regards the investing troops on the left bank of the Moselle, the following points are to be kept well in view :—

1. An attempt at an outbreak made by the enemy towards Thionville in the Moselle valley, on the left bank, must bring him into collision with the prepared position of the investing X. Corps, by which the proposed bridge will at the same time be secured. The adjacent corps would then have to attack the enemy's flanks.

2. The army shut up in Metz, after having to some extent reorganized itself, may try to break out direct to westward. This attempt must be stopped by the intervening line of investment with abattis, rifle-pits, and field-works, supported by the troops of the first line, and the rapidly advancing Corps of Reserve.

3. Should the enemy in the Moselle valley attempt to break out towards Pont-à-Mousson, he would have to come into collision with the VII. Army Corps, posted on both sides of the river above Metz, with a secure bridge communication. This Corps would then have to defend itself in an entrenched position, until supported on both flanks. The VIII. Corps, connected with them on the left, undertakes the line of investment (which is to be entrenched) as far as the height of the farm of Moscow, joining on the north the fortified position of the II. Army Corps, which Corps will, at the same time, undertake to secure the road between Woippy and St. Privat.

The Corps posted on the left bank of the Moselle are to make

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arrangements for their duties and distribution with a view to carrying out the following measures :—

1. Strong advance-posts to be maintained on the entrenched line of investment.
2. A proportionate part of the Corps to be daily told off for work, so as continually to strengthen the line of investment.
3. The remaining part of the Corps to be so placed in rear (in a good hut encampment, which may be daily improved) that it may be brought quickly to the front.

The III. Army Corps is to serve as a reserve for the right wing of the line of investment, and to build itself regular camps (to be improved day by day) in the neighbourhood of the farm of Cautre.

The IX. Army Corps to be encamped in huts near St. Ail and St. Marie-aux-Chenes, as left wing of the line of investment.

The 1st Division of Cavalry to remain at Rezonville until further orders.

The headquarters of Corps are, as far as possible, to have telegraphic communication with one another, and with the Commander-in-Chief.

On the 19th of August, Major Leuthaus, the commanding officer of the Engineers and Pioneers of the Second Army, was instructed to proceed with the reconnaissance of the ground in front of Metz, with reference to the proposed entrenchments.

According to the projects sent in the following day, and approved by the Commander-in-Chief, merely general instructions were given as to the way in which the fortifications were to be executed, leaving to the Army Corps the special arrangements as to choice of positions and details of construction.

The line of investment on the left bank of the Moselle was to commence on the right wing, at Vaux, following the plateau of Amanvillers and Pont-du-Jour, northwards to the ruin of Chatel ; then, after crossing the gorge of Chatel, to cut through the plateau of Amanvillers and Plappeville, past the villages of Saulny, Plesnois, Norroy, and Fêves, following the east crest of the heights on the left bank ; from thence, past Semécourt and Amelange, closing on the Moselle opposite Argancy.

To communicate with the position on the right bank of the Moselle, military bridges were to be constructed at Ars and Ancy, on the south of Metz, and at Argancy and Hauconcourt on the north.

At first it was contemplated to have only one fortified position on the right of the Moselle valley, south of Metz, and the same on the north and north-east, with a view to strengthen the line from Malroy to Charly, and from Failly to Noisseville.

The following instructions were issued respecting the construction of the fortifications :—

1. Closed works are only to be used sparingly, as they limit the defence to particular points, and do not give much better cover from artillery fire (which is naturally concentrated on them) than shelter-trenches or artillery emplacements. In accordance with this, the greatest use is to be made of shelter-trenches, with artillery emplacements to flank them, and sweep the ground well in front, especially along the most important roads.

2. The valleys crossing the line of investment, and the roads leading towards Metz, are to be obstructed by the densest possible abattis.

3. Plantations running parallel to the line of investment are to be cut down and made as impassable as possible.

4. In cases where woods run right across the line of investment, openings are to be cut through, the breadth of them to be gradually increased from fifty to a hundred paces. The plantations are to be obstructed so thoroughly by abattis that not even riflemen at open order may be able to get through.

5. It is of special importance to have good communications between the different positions. Accordingly, when communications are deficient, on ground covered with wood, they are to be at once established either to the rear of the line, or parallel with it, and should be first improved, and then increased in number.

On the evening of the 22d of August, whilst the Army Corps were commencing to entrench the different positions assigned to them, the arrangements for the investment of Metz were altered in some points, in consideration of the recent accurate reconnaissance of the ground. The VIII. Army Corps was specially charged with the defence of the gorge of Chatel, so that the right wing of the II. Corps stood in the Bois-de-Chatel. The 1st Cavalry Division was moved towards St. Marcel ; the IX. Corps got orders to send one division as a reserve for the X. Corps to Marange, and the rest to Roncour, when they were to begin putting the roads from thence to the Moselle valley in good order.

The III. Corps was moved towards Habonville, with directions

to establish roads for columns from that place to the plateau near Plappeville.

The Commander-in-Chief further directed that the advanced posts should be pushed towards the fortress so far to the front that there should be everywhere, at all points, immediate contact with the enemy. Also that the Army Corps should, at suitable positions, establish permanent posts of observation to be occupied by officers, who would have to send morning and evening reports to headquarters.

On the 23d of August the several sections of defence were (in accordance with the instructions of the Commander-in-Chief issued on the 19th and 22d of August) occupied as follows :—

1. On the left bank of the Moselle.

The 13th Division of Infantry from the Moselle to the Gravelotte road.

VIII. Army Corps from this road to the further side of the gorge of Chatel.

II. Army Corps from the Bois-de-Chatel by Saulny to Norroy.

X. Army Corps from Fêves by Semécourt to the Moselle.

IX. Army Corps, with one division behind the X. Corps at Marange, and the rest at Roncourt.

III. Army Corps at Habonville.

1st Division of Cavalry at St. Marcel.

Altogether, $5\frac{1}{2}$ Army Corps and 1 Division of Cavalry.

2. On the right bank of the Moselle.

3d Division of the Reserve from Malroy to Charly.

I. Army Corps from Failly to the Strasburg road, consisting of :

The 1st Division of Infantry in the section between Failly and Servigny ;

The 2d Division of Infantry at Laquenexy, principally to cover the railroad from Courcelles to Saarbrück ;

The 3d Division of Cavalry from the Strasburg road to Frescaty ;

The 14th Division of Infantry from Frescaty to the Moselle, with one Infantry Brigade as a reserve at Ancy.

Altogether, therefore, there were 2 Army Corps and 1 Division of Cavalry on the right bank.

With this distribution the southern side of the right bank of the Moselle appears to have been weakly occupied ; but, in the opinion of the Commander-in-Chief, any attempt at breaking out by the Army of the Rhine would have been in a westerly or northerly direction.

An attack was more particularly looked for on the west side, as it might have been well prepared under shelter of Fort Plappeville, and in its execution would have met with comparatively few obstacles of ground. Indeed, this consideration was the chief reason for pushing forward the Corps to the north-west on the 22d August.

The charge of guarding the very important railroad from Strasburg to Frouard was mainly left to the VII. Army Corps, which occupied a well-prepared position, and could in a few minutes get support from both banks, as there were a great number of secure passages across the Moselle.

The actual works of the investment were begun along the whole line on the 20th August ; those on the left bank being put under Major Leuthaus, commanding the Engineers and Pioneers of the Second Army ; those on the right bank under Major-General Bichler, commanding the Engineers and Pioneers of the First Army.

The first thing to be done was to establish secure communications between the two banks of the Moselle, so as to do away with the separation of the different sections and allow the troops to shift rapidly from one bank to the other.

Taking first the communications on the south side of Metz, there were :—

1. The railway-bridge at Ars—quite serviceable, but commanded within range by Fort St. Quentin. According to the accounts of spies, this bridge was prepared for demolition, and, after careful search, two mine chambers were discovered, but they were not charged.

2. The massive bridge in course of construction on the high-road between Ars and Jouy-aux-Arches, which was made passable for troops of all arms on the 22d of August. Four loaded mines were found in this bridge, which were partially unloaded, after cutting off the train. On the 27th of August, however, they were again made ready for firing by order of the Commander-in-Chief.

3. On the 22d and 23d of August three military bridges were built at Ancy with the Pontoon trains of the VII. and VIII. Army Corps,

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having military roads on both banks crossing the railway and joining the road from Nancy. (1st Field Pioneer company of the VII. Army Corps.)

4. A suspension bridge at Corny.

5. On the north side of it a trestle-bridge of rough materials. (Got ready on the 21st August by the 1st Field Pioneer company of the VII. Army Corps.)

6. South of Corny, near Arnaville, a trestle-bridge, constructed with rough material, was prepared on the 17th of August by the 3d Field Pioneer company of the IX. Army Corps.

Thus on the south side of Metz the communication from bank to bank was assured by no fewer than eight bridges.

On the north side of Metz the following were constructed:—

1. A bridge at Hauconcourt by the 1st Field Pioneer company of the X. Army Corps, making use of the bridging materials carried by the X. and XII. Army Corps.

2. A second bridge was also constructed by the Pioneers of the X. Army Corps 800 paces south of Argancy, near the fighting position of the Corps.

This was removed on the 25th of August and placed close beside the above-named bridge at Hauconcourt, so as to make a better connexion at this point between the two shores. The passage was protected by a double bridge-head.

3. On the same day a Pontoon bridge was constructed by the I. Army Corps at Argancy in place of it, so that there were three bridges on the north side of Metz.

In addition to this, as a further means of communication, a ferry-boat, sunk by the French, was recovered and put into use again near Hauconcourt.

It did not appear necessary to increase the number of passages across the Seille at once, as the existing three bridges, together with a ford for the Division of Cavalry, were sufficient.

To facilitate the transmission of orders, the different headquarters were connected by electric telegraph.

As the water-way of the Moselle might possibly be used by the French* to send floating bodies filled with letters out of the

* According to Lieutenant Fay, of the French service, this was actually done at the suggestion of a Customs official, who claimed to have made frequent use of this method in Algiers. Indeed, on the German side at Hauconcourt, several bottles, etc. (with letters to the Commandant of Thionville) were caught.

fortress, a net was stretched across the river, north of Ars, as a bottle-catcher ; floating trees and nets were also anchored above and below the bridges of Hauconcourt.

In order to obtain the earliest possible information of the enemy's proceedings, so as to be able to support the threatened positions in good time, observatories supplied with telescopes were established, some at once, some in the course of the investment, as directed by the Commander-in-Chief. These were occupied by officers of all arms (Engineers included) for the purpose of observing the camps, passages across rivers, and roads. The principal positions selected were on the spur west of Jassy, on the Horimont, near St. Barbe, on the height south of Montoy, on Mercy-le-Haut, and on St. Blaise.

As there was also a possibility of the French making use of the railway to bring up small detachments more rapidly, and of their attempting to push trains of wounded out of the fortress into our lines, a demolition was effected north of Tournebride in the line from Nancy, unobserved by the enemy, on the night of the 23d of August (by the 3d Field Pioneer company of the VII. Army Corps), and an opening made of about 13 metres.

With the same object, the line from Thionville was demolished at Ladonchamps, on the 1st September, and on the next night further in advance of the outposts near St. Agathe (by the 2d Field Pioneer company of the VII. Army Corps).

These measures were not adopted to the same extent on the line from Saarbrück, as we shall see later.

In the latter half of August, the Pioneers of the VII. Army Corps discovered the aqueduct from Gorze to Metz in the Mance valley, west of Ars, and also at Vaux. The water was turned off and the course obstructed.

In spite of this it appears to have been made use of afterwards by French spies. At all events, some of the Hessian outposts caught a peasant with despatches at the outflow of it, upon which the canal was reconnoitred by Hessian Pioneers, as far as St. Ruffine, and again obstructed.

During this reconnaissance the Pioneers came across some of the enemy's patrols, who were driven off by their fire.

The process of strengthening the line of investment by fortifications, strictly so called, was also commenced on the 20th August, and was continued almost uninterruptedly to the end of the investment. In some cases, the works in hand required constant improve-

ment, while in others alterations and corrections became necessary on account either of a change in the position, or of the stronger or weaker occupation of a section, greater or less probability of an attack, or in consequence of changes in the weather. Besides this the individual views of the several commanders of sections, and Engineer officers concerned, had a great deal to do with the alterations and new constructions. The shifting of the troops, however, which was rendered frequently necessary in consequence of changes in the military situation, was probably the chief cause of the numerous corrections in the works.

The positions to be fortified were, as a rule, decided upon by the respective Commanding officers of Corps or Divisions, with assent of the Engineer officers attached.

All the works were executed by the Pioneer companies, with the assistance of working-parties of the line, generally in entire battalions or companies. The Infantry Pioneers, as far as is known, were never much worked while before Metz. But few of those men who had been instructed as Infantry Pioneers were to be found after the first murderous battles, and the troops, with their reduced numbers, could not spare those left. Besides, there was a general want of entrenching tools, most of which had been lost, or become unserviceable.

In the following pages it is proposed to give a connected description of the whole of the investment, with its battles, and in connection with it, to discuss the special work of the Pioneers, arranged according to the several sections of defence.

We have considered the first position of the investing armies, and seen how the Corps were occupied in preparing for an obstinate defence in the positions assigned to them.

In the early days they were not in any way disturbed at their work by the French, as the latter were fully occupied with their re-organization, and were quite unequal to energetic operations. According to French sources, the Army of the Rhine was so far fit for work on the 22d August, that it might have attempted to break through on the 23d or 24th. At least General Soleille (commanding the Artillery), announced to Marshal Bazaine on the 22d August, that the field-batteries were provided with ammunition and ready to move, the parks complete, and 140 rounds per man provided for the Infantry, besides a grand reserve of 1,300,000 rounds.

Under date of the 19th of August, Bazaine had reported that he still hoped in a few days to be able to march northward on Montmedy, and from thence to gain the road from St. Menehould to Chalons. Should, however, this road be found to be too strongly occupied, he would go to Sedan, or even to Mezières, and from thence advance to Chalons.

These communications, as well as distinct orders, decided Marshal MacMahon to commence his march from Rheims on the 23d of August, past Rethel, and towards the northern fortresses. The French plan for joining the armies of MacMahon and Bazaine was understood on the German side in good time. As early as the 20th of August, the Commander-in-Chief of the IX. Army Corps had issued an order for the complete destruction of the Metz and Thionville railway at Richemont. These instructions were executed on the 21st of August by the 3d Field Pioneer company of the IX. Army Corps (Captain Schulz), under cover of a detachment of cavalry.

The garrison of Thionville endeavoured to impede the demolition by sending a train full of Infantry out of the fortress as far as Ukange. The Germans, however, succeeded in thoroughly destroying the railway-bridge across the Orne, as well as the chaussée-bridge, by blowing up two arches of the one, and one of the other.

The Commander-in-Chief of the investing army of Metz, and of the Army of the Meuse, were also directed by telegraph from general headquarters, on the 24th of August, to make the railway between Rheims, Longuion, and Thionville impassable for some time in different places.

A detachment of the 2d Field Pioneer company of the III. Army Corps (First-Lieutenant Koch), which had marched off on the 25th of August in the direction of Longuion, covered by the Ziethen Hussar Regiment, carried out the above order, and on the 27th and 28th of August, on the line from Longuion to Montmedy, destroyed two masonry bridges across the Chiers, as well as a tunnel. The bridges were destroyed in lengths of about 20 metres, so that a long time would have been required to re-establish the line. The railway from Longuion to Thionville was also made impassable by demolitions.

On the 26th of August Marshal Bazaine made an attempt at breaking through by the right bank of the Moselle towards Thionville, and on the 24th the 3d French Corps had, with this object in view, been moved to that bank.

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The passage of the other Corps came to a standstill on the 26th of August because of their omission to make good the approaches to the bridges that had been restored, so that the columns had to cross one another. Nor were the bridges practicable for vehicles, so that the troops were not in position before noon.

About this time the enemy began to develope considerable masses of infantry in front of the lines between Malroy and Charly, and opposite Servigny; he also commenced firing with his skirmishers at very long ranges, but without any result worth mentioning.

After the enemy had become convinced that there were considerable forces on the German side, and a numerous artillery in position, they occupied the Fort St. Julien, and ceased to prosecute the attack. The heavy rain that had come on in the meantime appeared to have a decided influence in inducing them to adopt this course. The French Council of War, which was then immediately assembled, not only approved this resolution, but considered it most advantageous for the army to await the course of events under protection of the fortress; because, in the incomplete state of the construction and armament of the forts, the fortress could not be considered sufficiently secure without the protection of the army, and also because the detention of so large an army of the enemy (respecting the size of which there was, however, some delusion) would be in the highest degree beneficial to the defence of the country.

It was proposed to raise the *morale* of their own troops by small sorties, thereby perpetually harassing the Germans, and at the same time increasing their own stores by foraging among the homesteads.

In consequence of this decision the French troops went sullenly back to their old bivouacs, where they arrived on the 27th of August, only the 2d Corps being left behind on the left bank of the Seille.

Under these circumstances nothing less than the reports received from Marshal MacMahon, on the 30th of August, were required to give the necessary impulse for a fresh enterprise, which was fixed for the following day.

Before entering on this we must notice that, dating from the 22d, the forts began to disturb the works of the investment by their fire, without, however, securing any important results. The attempt of the 26th of August certainly caused a stoppage of the works on the front from Malroy to Charly, but as there had been

but little progress made in them on this side, the cessation of the attack was all to the advantage of the army of the investment.

On the opposite side an order of the General commanding the First Army had occasioned various enterprises against Fort St. Privat on the 25th of August and on the following days.

This fort not being armed, and only guarded by detachments of the 3d French Corps, was to be demolished. With this object, Major Treumann, commanding the Engineers and Pioneers of the VII. Army Corps, with the 3d Field Pioneer company of the VII. Army Corps (Captain Cleinow), and two companies of infantry, under the protection of covering troops, entered the work and attempted to make the ditch passable by cutting down the parapet and slopes. This work had to be given up, however, owing to the heavy fire of guns and small arms from the works in rear, in course of construction, as also from large bodies of troops that had advanced towards the gorge of the work.

The Engineer officers took this opportunity of making an accurate reconnaissance of the fort, and found their view confirmed that the demolition and levelling of this great work, now for months in course of construction, would be a very heavy task, as it would have to be carried on under the effective fire of forts St. Quentin and Queuleu.

This first attempt had the effect of causing the enemy to occupy the fort on the 26th of August in greater force, they having hitherto only had a guard in it.

In consequence of this the General commanding the First Army ordered the fort to be cannonaded with field-artillery on the 27th of August, and civilian labourers to be collected for levelling it. After a cannonade of two hours the garrison left the work, but returned soon afterwards in greater force.

As the fire on this side was ineffective it was discontinued about 2 o'clock in the afternoon, but re-commenced towards evening. The result, however, merely was that the French from this time forth made every effort to keep a firm hold on the work, hitherto deemed worthless by them, and, with this object, sought to strengthen the fort by every available device of fortification.

On the same day there was a material improvement in the occupation of the right bank. The Inspector-General of Etappen (First Army) having undertaken to secure the line of the Moselle, had occupied the Chateau of St. Blaise, so that the 28th Brigade of

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infantry, with one squadron and two batteries, hitherto left behind at Ancy, could march up on the right of the 27th Brigade, and the space to be covered by the 3d Division of Cavalry was therefore considerably reduced. The mass of the brigade occupied bivouacs on the south-west of Pouilly, and placed advanced posts in the line of La Papeterie, St. Thiebault, and the height eastward of this farm. Magny remained unoccupied by either army, as the French line of outposts was close behind the railroad, and the German occupation of a village only 300 paces south of it was not practicable.

In consequence of the 14th Division of infantry having extended their position across the Seille, it became desirable to increase the number of communications over that river. The necessary bridging-works were carried on by the 1st and 3d Pioneer companies of the VII. Army Corps, and by the 7th of September the following bridges were ready, with approaches, viz.:—

- (1.) Bridge at Marly.
- (2.) Bridge at Cuvry.
- (3.) Bridge south of the mill at Fleury.
- (4.) Two new passages south of the same.
- (5.) Bridge south of the Bois de Lamenée.
- (6.) Bridge east of Coin-sur-Seille.
- (7.) Bridge of Sillegny.

On the 27th of August the French troops succeeded in bringing corn into the fortress out of Villers l'Orme and Chieulles. By this time the Germans were thoroughly well informed of MacMahon's approach.

To meet all eventualities, therefore, the II. and III. Corps got orders from headquarters to proceed to the support of the Meuse Army, towards Briey and Etain, in order to push on from thence to Mangiennes and Damvillers. The two Corps arrived at Briey and Etain on the 27th of August, but got orders on the following day to remain there for a while, as, owing to the successful result of the operations of the Third and Meuse Armies, it appeared no longer requisite to reinforce the latter.

In consequence of the departure of these two Corps the following alterations in the position of the troops were carried out on the 28th of August:—First Army (headquarters at Jouy and Arches), with its right wing resting on the lower Moselle.

3d Division of the Reserve from Malroy to Charly, with 15 battalions and 36 guns.

The fortified position appeared to the Commander-in-Chief to be sufficiently strong, and three divisions, belonging to the IX. and X. Army Corps, were directed to give support in succession from the left bank of the Moselle. The 2d Division of Infantry, between Failly and Servigny, were in immediate contact with the 3d Division of the Reserve, and behind them were the Artillery of the I. Corps.

A thin line of investment formed of cavalry outposts extended from Servigny to Laquenexy.

The 1st Division of Infantry was posted at Laquenexy, as well as a brigade of Infantry of the VII. Corps, with Artillery along the Strasburg road and the Seille. This brigade was to show troops to the enemy, then support the 1st Division of Infantry. It was also to act as a support to the 3d Division of Cavalry, which had in general retained its original position.

The VII. Army Corps (with the exception of one brigade) stood as before in a well-prepared position across the Moselle. According to the view of the Commander-in-Chief the position of this Corps, especially on the left bank, was so strong that there was no cause to fear that the enemy would break through up the valley of the Moselle.

The VIII. Corps had occupied a strong and well-fortified position extending from Jassy along the heights of Rozérieulles by Châtel, the plateau of Plappeville, and Saulny, to Norroy. The Commander-in-Chief considered that, in spite of the great extension of this Corps, the position was quite tenable, because the enemy could only push forward through narrow defiles, which could be seen and fired into at all points from Artillery emplacements and rifle-pits.

The X. Army Corps occupied a carefully-prepared line of defence from Fèves by Semécourt and Amelange to the Moselle. The outposts were pushed forward as far as Ladonchamps and La Maxe.

According to the opinion of the Commander-in-Chief, the enemy could not attempt any serious attack against the position held by the X. Corps, because it was so much retired that the attack would have had to develop itself under flank fire of Artillery.

Only the IX. Army Corps remained as a reserve for the army of investment. The 25th Division of this Corps lay at Pierrevilliers, while the remainder were posted between Roncourt, Montois, and Malancourt. This reserve held itself in readiness at any moment

to support the VIII. and X. Corps by crossing to the right bank at Hauconcourt.

On the 28th of August, however, the Commander-in-Chief did not ignore the fact that, with the very diminished force at his disposal, he could not prevent Marshal Bazaine from breaking out on the right bank of the Moselle towards the north-east or south-east, should he seriously determine on doing so. For this emergency the corps had orders to hang on the flanks and rear of the enemy. Should he try to reach Thionville, it was intended to obstruct the passage of the Moselle by the two Army Corps drawn from Briey and Etain.

Owing to alterations in the strategical conditions these two corps were drawn nearer to Metz, and, on the 29th of August, the II. Corps was concentrated at Auboué and Briey, the III. Corps at Doncourt and Conflans, while Ziethen's Hussars, attached to the latter corps, patrolled eastward of Longuion up to the gates of Longwy, and the Luxembourg frontier.

The German investing troops being in this position, important movements on the part of the French were reported from all observatories on the morning of the 31st of August.

According to French sources, the army of the Rhine was to move in the following order :—

The 3d Corps on the line from Grigy to Nouilly.

The 4th between Mey, Villers-l'Orme, and Grimont.

The 6th Corps '*à cheval*' on both sides of the road to Bouzonville.

The 2d Corps, as a reserve to the right wing, beginning from the farm of Balle-croix '*à cheval*' the ravine of Vallières.

The Guards and Cavalry of the Reserve between Fort St. Julien and the forest of Grimont.

The right wing was to begin the attack, and, after wheeling to the left, was to combine with the left wing, and take the position of St. Barbe, so as to gain the roads leading to St. Barbe, Vigy, and Bouzanville.

The movements of the French began about half-past 6 in the morning, but the arrangements were as bad as they were on the 26th of August, so that the Corps intended for the left wing frequently crossed one another, and it was 1 o'clock before three divisions of the 3d Corps and two divisions of the 4th Corps were in position in the first line ready for the attack. Even then Mar-

shal Bazaine thought it necessary to begin the attack with heavy artillery, and caused batteries for guns of position to be constructed on the left of the road to St. Barbe, which could only open fire between 3 and 4 o'clock in the afternoon.

Meanwhile the time thus allowed to elapse was not wasted on the German side.

By order of the General commanding the First Army, the 28th Brigade of Infantry at Pouilly was moved as early as 7 o'clock in the morning, while the 25th Division got orders at half-past 11 to cross the Moselle and reinforce the right wing.

General von Manteuffel moved the 3d Infantry Brigade, posted at Courcelles, towards Puche, and later towards Retonfay, occupying the position from Mercy-le-haut, Aubigny, and Colombey, with only one brigade.

The 32d Division of Cavalry concentrated at Retonfay, the Landwehr Division (Von Senden) was moved towards St. Barbe.

By order of the Commander-in-Chief, early in the forenoon, the 25th Division was directed to move on to the right bank of the Moselle, the rest of the Corps concentrating at Roncourt, and the III. Corps at St. Privat. The II. Corps was held in readiness between Auboué and Briey, having at the same time to send a detachment to Aumetz.

The French attack against the German left wing began at 9 o'clock in the morning, with about 8 battalions and numerous Cavalry. Colombey had to be evacuated, while Mercy-le-haut and Aubigny remained in our hands; there was also a brief artillery engagement about half-past 10 o'clock on the right wing.

It was remarkable that all was quiet on the French side until the opening of the fire at Grimont gave the signal for continuing the offensive.

At half-past 6 o'clock in the evening the French troops succeeded in driving back the battalion posted at Noisseville and the Brasserie, and in compelling the withdrawal of the Prussian Artillery at Servigny. At 9 o'clock, however, Noisseville was retaken. About 10 o'clock the whole line of the enemy advanced to the attack, and, pushing forward on the road towards Saarbrück, which was only covered by Cavalry, took possession of Flanville; the Brasserie was soon afterwards lost, upon which Noisseville had to be abandoned. A concentrated attack against Servigny put also this village, up to the last house, into the possession of the

French. An energetic counter-attack, however, threw them back again, while Failly and Poixe were maintained against repeated assaults.

The firing ceased about 11 o'clock in the evening. As a result, therefore, of the efforts of the French, we see, on the evening of the 31st of August, the German troops unshaken, and holding the main positions of Malroy, as well as Charly, Failly, Poixe, and Servigny, and only driven back on the left wing out of Flanville, Noisseville, and the Brasserie.

During the night preceding the 1st of September, the 18th Division of the IX. Corps was sent to the assistance of General Manteuffel, and, in the morning, the greater part of the X. Army Corps was put in motion, so that, on his side, the General could assume the offensive early on the morning of the 1st of September, in order to regain the lost positions, especially Noisseville. That village could only be retaken after a heavy cannonade, having been three times assaulted in vain.

Meantime the 28th Infantry Brigade had moved out from Puche about 6 o'clock, and, about 9 o'clock, had retaken Flanville, and then Coincy. This brigade then took up a position *à cheval* the Saarbrück road, repulsing several subsequent attacks.

Other portions of the VII. Corps were also made use of to support the left wing of the I. Army Corps on this day.

On the other wing, at about 9 o'clock, the enemy repeatedly attacked the entrenched villages Rupigny and Failly without result, upon which the 3d Division of Reserve, with the Reserve Brigade, posted in the Bois-de-Failly, assuming the offensive, advanced out of their fortified position between Malroy and Charly, and threw the enemy back into the wood of Grimont.

About 11 o'clock the last attack of the enemy was made in two bodies against the position from Poixe to Servigny, and was again repulsed.

Second Period of the Investment.

As the first attempt of the Army of the Rhine on a large scale to break out towards the north had thus failed, and as, after the battle of Beaumont, the attempt to raise the siege by Marshal MacMahon's army might also be considered a failure, the Commander-in-Chief considered a second attack towards the north

highly improbable. He rather thought the Marshal would eventually select the south, from whence he could threaten the lines of communication of the German armies, or throw himself into the south of France.

In the south-east sections of the investing line, however, the force was, as we have seen above, relatively very weak. The Commander-in-Chief therefore issued the following orders, among others, on the 2d September, on which day the advanced Guard of the XIII. Army Corps (attached to the First Army) had arrived before Metz :—

The First Army is to undertake the investment on the right bank of the Moselle, and on that portion of the left bank extending from Ars to the ruin of Châtel ; the 3d Division of the Reserve retaining its present position from Malroy to Charly.

The I. Army Corps is to concentrate itself by bringing over the 2d Division of Infantry to the positions held on the 1st of September, extending its left wing so far as to bring the roads between Metz, Point-à-Chaussé, and Saarbrück, under fire of a strong battery on the left flank.

The XIII. Army Corps, after concentration, will entrench itself in a defensive position covering the railway from Courcelles to Remilly, and directly shutting out the enemy from the road leading from Metz by Solgne to Strasburg. More accurate reconnaissances will enable it to be ascertained if a position fulfilling these conditions can be found in the neighbourhood of Mercy-le-haut. The Cavalry of this Corps will post a strong cordon to the right, so as to communicate with the I. Army Corps.

A brigade of Infantry, detached from the VII. Corps and supported by Artillery, is to take up and entrench a position in the neighbourhood of the Seille, so as to secure a point of passage over that river, and serve as support to the 3d Division of Cavalry, who will form a strong cordon from the position of the XIII. Army Corps, extending to Frescaty.

The VII. Army Corps will, for the present, continue to occupy its positions as hitherto on either side the Moselle above Metz ; but should the enemy push forward in a southerly direction, it is to be held in readiness for an immediate march towards the Seille, on being relieved by the arrival of the Reserve Division of the VIII. Corps.

The VIII. Army Corps will occupy the line of investment extend-

ing from the entrenchment above Jussy to the ruin of Châtel inclusive, holding its Artillery and a division of Infantry in reserve, so as to have them available for occupation of the positions in that part of the Moselle valley.

The 1st Division of Cavalry will encamp in the neighbourhood of Jouxville, detaching a regiment towards Fléville, to observe the space between Longuyon and Damvillers, sending another regiment, with a detachment of Artillery, towards Etain, so as to secure the line of communication of the Army of the Meuse against attempts from Verdun.

The III. Army Corps will occupy the line from the valley of the railway at Châtel across the plateau of Plappeville and Saulny to the hill north of Saulny inclusive; the remainder of the III. Corps will be encamped in rear of this line, so as to be able to afford immediate support.

The X. Army Corps will maintain its present position in the valley of the Moselle.

The IX. Army Corps will return to its old position at Pierrevilliers, Roncourt, Malancourt, and Montois, as far back as the Orme.

The II. Army Corps is to remain at Auboué and Briey, taking care to extend its front in proportion as the III. and the Army of the Meuse move further to the west, so as to cover the investing army against attempts by hostile detachments from the north-west and west. A detachment of the II. Army Corps is to be moved on Longuyon, and to observe Longwy, as well as to watch the ground carefully as far as the Belgian frontier.

The detachment of General Bothmer (7 battalions, 4 squadrons, and 6 guns), together with four squadrons already there, will proceed to invest Thionville on both sides of the river. The other troops posted there of the 3d Division of Reserve, as well as the detachment of the IX. Corps, are to return to their divisions.

The most pressing duty of the investing troops of the first line now is to establish themselves firmly in their defensive positions, and to push out the Infantry patrols boldly to the front, so as perpetually to annoy and intimidate the enemy along the whole line; to make sure of shutting up the fortress, preventing all communication with the outside, or escape of the inhabitants, who, in case of necessity, must be driven back by fire.

At the approach of autumn, particular attention must be directed to the necessity for erecting huts and barracks, and for establishing good communications.

The above-mentioned changes in position were, to some extent, modified on the 3d September, as the XIII. Army Corps could only arrive in full strength on the 6th of September. It appeared also probable, in view of the massing of the enemy's Cavalry on the south of Metz, that an attempt would be made to break out there. In consequence of this, the available part of the 1st Division of Cavalry was directed towards Ars-sur-Moselle.

In the meantime the 50 12-centimetre guns already mentioned, together with 5 companies of Artillery, had arrived, and it was intended by the Commander-in-Chief to make an early use of these guns for a regular bombardment of Metz. He purposed having all the guns brought by night-fall to within about 2500 paces of the fortress, and then throwing altogether 1000 shell into the town and camp, without taking any notice of the uncertain night-firing from the forts. The guns were to be withdrawn during the night.

As, however, only 12 siege-carriage limbers were available, this project had to be abandoned, and an order was given to place the guns (10 pieces in each battery) at the most important points in the line of investment.

Accordingly, 20 pieces were given over to the VII. Corps, which were to be turned to account on the right bank of the Moselle; an equal number was handed over to the VIII. Corps, to be placed in pairs in batteries to be constructed on the plateau of Rozérieulles, as well as on the heights of Plappeville, and the remaining 10 guns were placed at the disposal of the X. Corps. Each gun was provisionally furnished with 250 shell and 25 shrapnel.

On the 6th of September the Commander-in-Chief gave fresh orders for assembling a greater number of troops towards the south, it being considered that, as MacMahon's army had now been destroyed, any attempt at breaking out towards the north or west was more than ever improbable. Whilst the 3d Division of the Reserve, as well as the I. Corps, held their original positions, the XIII. occupied the line from Ars Laquenexy to Peltre, the VII. Corps the line from Peltre to Marly, and the 3d Division of Cavalry the left bank of the Seille. The VIII. Corps took up the position hitherto held by the VII. Corps in the valley of the Moselle, and was supported by the 1st Division of Cavalry. The other positions on the left bank were occupied by the IX., III., and X. Corps.

For the protection of the rear of the investing army towards the north, and at the same time for the investment of Thionville, a bat-

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talion of Infantry was ordered from the X. Corps and 2 regiments of Cavalry, as well as a battalion of Infantry from the 3d Division of the Reserve.

In accordance with this, the following Corps were posted on the southern semicircle of the line of investment, beginning at the left wing :—

The III., IX., VIII., VII., and XIII. Army Corps, as well as the 1st and 3d Divisions of Cavalry. The II. Corps was placed in the rear as a reserve on the left bank, partly at Novéant, partly at St. Marcel and Rezonville. Altogether, there was a total of 6 Army Corps and 2 Divisions of Cavalry.

On the northern semicircle there were :—

On the right bank of the Moselle, the I. Corps, and the 3d Division of Reserve, and on the left bank the X. Corps: altogether 2½ Army Corps.

The headquarters of the Second Army was transferred to Corny.

In case of a decisive battle south of Metz, the II. Corps could take part in the action within two or three hours with its leading Division, and within six hours with its entire force. In case of the enemy breaking through towards Thionville, a division of the II. Corps, with artillery, starting from St. Marcel, could, after a march of 15 miles, place itself in front of the enemy in a good position near Pontois, until a sufficient force had been moved in this direction.

As the XIII. Corps were otherwise disposed of on the 10th of September (before Toul and in Rheims), a different arrangement of the investing corps appeared necessary, and accordingly the whole of the VIII. Corps was directed to the right bank of the Moselle, while the 25th Division of the IX. Corps occupied the position from Jussy to the Moselle.

The VII. Corps was moved to the right bank of the Seille, and pushed its right wing as far as Mercy-le-haut, while the I. Corps extended itself on the left up to Ars Laquenexy, giving over Failly to the 3d Division of Reserve.

At the same time the four Pioneer companies of the Guard and XII. Army Corps, hitherto attached to the army of investment, were ordered to march to Paris, but the Saxon Pontoon train remained with the X. Corps.

In the meantime the want of provisions began to make itself felt in Metz. On the 4th of September the rations were already

reduced, and horse-flesh served out. On the 6th of September the first rumours of the catastrophe of Sedan began to spread among the garrison.

At this period the question was frequently ventilated on the German side, whether a bombardment of the town and of the camps with the available 50 12-c.m. guns, in connexion with the field artillery, would hasten the surrender. The Commander-in-Chief selected the plateau of Woippy on the north, and that of St. Privat on the south of Metz as a position to be eventually taken up. Both, however, were strongly entrenched by the enemy, and under fire from the great forts, so that these plateaux could not have been occupied without entering into a severe engagement, the result of which was uncertain.

As the operation of arming the batteries at Woippy would have caused formidable difficulties owing to the great distance from the different railway communications, etc., the plateau of St. Privat was more particularly kept in view. Special arrangements of the batteries would have been necessary to keep down the fire of the right face of Fort Queuleu, so as to be able to push forward the line of outposts to the railway cutting south of Montigny. Only by these means would the construction of the batteries have become possible, though the distance from the centre of the town would have been not less than 6000 paces. An open assault against the forts, which were secure from escalade, was considered impracticable with so powerful an army opposed to them.*

It was therefore determined merely to annoy the suburbs of Metz, and the camps in their neighbourhood, by opening fire from time to time. About 7 o'clock on the evening of the 9th of September, accordingly, a bombardment was commenced with heavy field-guns on the entire circuit of the fortress, a great part of the investing army occupying defensive positions for the protection of the batteries, which were pushed forward as far as possible. The enemy replied to the fire with great vigour in some places, especially from Fort Queuleu, but no result was obtained on either side.

Dating from the 6th of September, the weather became remarkably unfavourable; a continual down-pour of rain making the ground

* A careful reconnaissance, conducted by Lieutenant Diener of the Engineers, between the 16th and 19th of September, certainly confirmed the reports of the defective construction of Forts Queuleu and St. Julien. These works were, however, secured against sudden assault by provisional measure.

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boggy and the bivouacs almost insupportable. Both sides suffered considerably under these conditions ; the German troops, however, the least, as from this time forward they were quartered as much as possible in close cantonments, while the French did not leave their bivouacs. The army of investment had therefore to direct their attention more than ever to the establishment of plenty of good communications, as well as to the drainage of the entrenchments.

As about the middle of September the supply of provisions in Metz diminished more and more, the enemy made several slight attempts against the German positions for the purpose of foraging in the surrounding villages. The hamlets of Mercy-le-haut, Ladon-champs, and Courcelles-sur-Nied, were selected as objects of attack.

On the German side, however, this had been already foreseen, and better protection had been projected for the important magazines at Courcelles-sur-Nied.

On the 17th of September, therefore, the VII. Army Corps was appointed to hold the line between Ponilly and Ars Laquenexy, occupying at the same time that portion of the village of Marly lying on the right bank of the Seille. The troops of the 'General-Etappen-Inspection' (two battalions of Landwehr and one battery) were sent from St. Blaise and Corny to Courcelles, and appointed to act as a fighting reserve for the right wing of the VII. Corps, which had undertaken to cover the road to Courcelles. The I. and VIII. Army Corps also were each directed to hold a Division in readiness for the support of the VII. Corps in case of an attack.

Soon after there followed a series of sorties, big and little, on the different fronts, in which the enemy frequently displayed several divisions. Thus, on the 22d of September there was a partially successful attempt against La Grange-au-bois (west of Ars Laquenexy), Nouilly, and La Vallière. A similar expedition on the 23d of September against Varny and Chieulles failed in its object. There was a more important sortie on the 27th of September against Peltre and Mercy-le-haut, with the object of bringing trains of provisions into the fortress after taking the railway station at Courcelles. The attempt succeeded so far that the advanced troops on our side were surprised, but a battalion of Infantry brought by railway up to the German advanced posts did most important service.

As the railway between Courcelles and Metz was interrupted, although but slightly, the French train could not get further than Peltre. The Prussian troops were speedily alarmed, and moved up, their appearance on the Strasburg road causing the French to evacuate all their positions by 1 o'clock. On the same day the 6th French Corps drove back the outposts of our X. Corps, and carried off some stores out of the Grande and Petite Maxe, as well as Ladonchamps.

As the numerous villages and farms lying between the advanced posts of both sides were never entirely abandoned by their inhabitants, and as these appeared to have an understanding with the French army, an order was issued about this time by the Commander-in-Chief to have all such stores as could have any value for the enemy destroyed and burnt.

Another project, which had been already mooted about the 13th of September by the General commanding the Second Army, was now brought forward for final decision. It was the question if it were not possible by damming the Moselle below Metz to raise the level of the waters so high as to submerge the islands of Chambières and Symphorien, as well as the lower parts of the town. This would have entailed very serious hardship upon the defenders, as several camps and the main hospital would have had to be moved. It was ascertained by careful reconnaissance and levelling (by order of Major Leuthaus), that there was a fall of about 7 metres in the Moselle between Metz and Argancy. On these data an estimate was made of the necessary labour and material for this dam, and the time required for labour was calculated at a minimum of eight weeks. The height of the dam was taken at about 13 metres, and very strong sheet-piling was considered necessary for its protection.

This project was submitted to the Commander-in-Chief on the 18th of September.

On the 24th, a Committee, consisting of several Engineer officers, together with an experienced hydraulic engineer, were summoned for another consultation. The Committee objected to the project, as its execution would have involved very considerable expenditure of labour and materials, as well as occupying at least four months.*

* The architect Schwarz had proposed to build the dam on a foundation of fascines and broken stones which were to be got by 300 labourers from the quarries of Marange, 4½ miles from the point of construction. The filling, calculated at 450,000 (45,000?)

Under these circumstances, the project was definitively abandoned early in October.

The possibility of a formal attack was also borne in mind, and about the end of September another careful reconnaissance of the whole of the ground in front of the fortress was undertaken by the Engineer and Artillery staff of the First Army, the results of which may be summarized under the following heads :—

(1.) The enemy takes every measure for stubbornly maintaining his ground, since he continually strengthens his position by means of field fortifications.

(2.) The armament of the forts is for the most part completed.* Proof of this was afforded by their heavy firing on isolated troops in the cantonments and bivouacs of the Investing Army for some days past.

Third Period of the Investment.

We are now arrived at the third and last period of the investment, when it was considered that any attempt at breaking through would probably be made on the north-east side.

Owing to the fall of Strasbourg, on the 27th of September, the newly-formed XIV. Army Corps, now only a few days' march distant from Metz, had become available for operations in the south.

As, since the 23d of September, Toul also was in the hands of the Germans, the chances of a successful attempt to break through on the south or east sides were considerably diminished. It was equally improbable that Bazaine would attempt the west side, where the ground, which was naturally very unfavourable for handling masses of troops, presented, with its extended line of entrenchments carefully strengthened, almost insuperable difficulties to an attack.

In case, therefore, Marshal Bazaine had serious intentions of cubic metres, could then have been completed in 115 days. The transport of the stone to the river, on a tramway, the construction of the stone foundation, the filling in of the earth to reach across the whole valley of the Moselle, could have gone on simultaneously with the breaking of the stone. Including the necessary preparation, about four months were considered requisite, not taking into account exceptional levels of the water which the enemy could always bring about by means of their sluices.

* A French report says—"By the middle of September the forts were completed and prepared for any attack ; the weak points in the neighbourhood of Metz, the plain of Woippy, the plateau of St. Privat, the ground in the neighbourhood of the roads from Saarbrück and Strasbourg, were furnished with well-built works completely armed."

breaking through, there remained only the road to Thionville on the right bank of the Moselle.

In the early days of October, while a portion of the Artillery and Cavalry were still in fighting order,* there was a possibility of success, supposing the Marshal to have made vigorous demonstrations on all sides, and to have advanced suddenly before daybreak, moving simultaneously against the north-east fronts, and against the positions of the Investing Army in the valley of the Moselle. It would then, perhaps, have been still possible to have broken through, with from seventy to eighty thousand picked troops, towards Thionville, in which fortress there were provisions for at least eight days. Here the Marshal might have accepted battle, though with small prospect of success, or have crossed over to the neutral territory of Luxembourg and Belgium. Such a step would have been far better for France than the finally inevitable capitulation of the army under the walls of Metz, which—and in this the Marshal could hardly have deceived himself—of necessity involved the fall of the fortress. Had the line of investment been broken through, even with the probability of having to seek neutral territory, Metz might have held out several weeks longer, as the numbers to be rationed would have been reduced by half.

These considerations determined the Commander-in-Chief to move the mass of the blockading force more to the north-east. Reliable information concerning the collection of stores of provisions on the Luxembourg boundary, as well as the increased number of bridges near Fort St. Julien, strengthened the determination of the Commander-in-Chief, and orders were issued on the 1st of October that the 3d Division of the Reserve should occupy the carefully prepared entrenched position between Fêves, Semécourt, and Amelange, which was armed with 10 rifled 12-c.m. guns.

The X. Corps, on the other hand, took up the position between Malroy and Charly, and Kummer's Division was put under the General commanding that Corps.

The I. Army Corps was concentrated in the line from Failly by Servigny to Noisseville. The VII. Corps occupied the line between Montoy and Ars Laquenexy, and posted a division of Infantry, as well as Artillery, in such a manner as to be able to make a rapid movement to support the I. Corps.

* According to French sources, 1500 to 2000 private horses, mostly in good condition, might have been requisitioned in the town.

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The VIII. Army Corps had the line from its junction with the VII. to the Seille below Marly, while that place and the forest enclosures in front on the right bank of the Seille were occupied by the II. Corps. The VIII. Corps in the same manner posted their reserves behind the right wing.

The 1st Division of Cavalry was attached to the I. Army Corps and removed to Les Etangs, while the 3d Division of Cavalry, appointed to the VIII. Corps, occupied cantonments across the road from Metz to Strasbourg.

The II. Corps occupied the line from Marly to Vaux, across the Moselle, while the IX. retained the line from the height of Jussy to the ruin of Châtel inclusive, allowing a division of Infantry, together with the Artillery not required in the first line, to encamp at Gorze, Gravelotte, and Rezonville.

The III. Army Corps extended its front to the left as far as Norroy, concentrating its reserves behind the left wing.

In order to be able to support Kummer's Division vigorously, in case of an attack, the passages across the Lower Moselle were increased by a trestle-bridge at Tallange, made out of rough materials, which was completed by the 1st Field Pioneer company of the X. Army Corps on the evening of the 2d of October. In the same way, on the south of Metz, the Pioneers of the II. Army Corps threw a pontoon-bridge across the Moselle at Novéant, after the trestle-bridge at Amanville, which had been destroyed by a raft, had previously been replaced by another pontoon-bridge.

No sooner was the new distribution of troops completed than the VI. French Corps (with two divisions, according to French accounts), by direct order of Marshal Bazaine, made an attempt against the advanced posts of Kummer's Division* on the night of the 1st October.

The weak pickets at Ladonchamps and St. Agathe were driven in, while, on the other hand, the positions at Bellevue, St. Rémy, Petite and Grande Tapes, were energetically maintained, with the assistance of the artillery in position.

A series of counter attacks undertaken at once against the chateau of Ladonchamps failed. The French outposts very quickly ensconced themselves in the court-yard, which was surrounded by a wet ditch. In order to connect the rear with Woippy,

* After the engagement of the 27th of September the X. Army Corps ceased to occupy the burnt villages of Petite and Grande Maxe.

a line of entrenchment was thrown up by them and the construction of a battery at once commenced in the park. St. Agathe was retaken in the morning at 7 o'clock, but had to be evacuated, as Ladonchamps remained in the hands of the enemy. This little success gave the French troops no material advantage, as they could only carry away a few stores from St. Agathe.

The Germans contented themselves with a slow fire on the chateau of Ladonchamps, and renounced for the time any attempt at reconquering that very exposed post. However, on the evening of the 7th of October an attack was contemplated, and at the same time the 2d Field Pioneer company of the X. Army Corps was charged with the demolition of the chateau. This operation was not carried out, as the French made a sortie at noon on the 7th of October, intending, according to French accounts, merely to clear out any stores from the villages of Petite and Grande Tapes and Bellevue. For this purpose the 6th and the Corps of the Guards were at the disposal of Marshal Canrobert, while the 3d Corps was to make a demonstration on the right, and the 4th on the left wing.

About 1 o'clock, the French columns, whose reserves were posted on the Woippy heights, debouched out of the forest of Woippy as well as from Ladonchamps and Maxe, and after a hard fight drove back the advanced troops of the Landwehr Division from Bellevue, St. Rémy, and the two Tapes. The X. Corps at once sent its 38th Brigade across the Moselle, and the III. Corps put the 9th Brigade and 2 batteries under General Kummer's orders; so that by 4 o'clock he was able to take the offensive. The enemy made a very obstinate defence, and only retreated very slowly: nevertheless, towards evening, Kummer's Division again held their old position, as well as the Woippy wood. An attack against Ladonchamps by this division, as night drew on, failed, and was not repeated, as it would have cost too much.

The hostile demonstrations in front of the X., I., and VII. Prussian Corps had led only to alarms, and to a furious artillery action, which also ceased towards evening. On the front, between Villers-L'Orme and Nouilly, there was a fight between skirmishers.

This was the last serious attempt of the French Army of the Rhine.

The enemy's sorties on the 3d and 7th of October caused the Commander-in-Chief to reinforce the position of the 3d Division of Reserve, and accordingly the 19th Division of Infantry, in addition

to the 3d Division of Reserve (reduced to 12 battalions by troops detached and by heavy losses), was directed to hold the position between Féves, Semécourt, and Amelange.

As, in the meantime, the investment became more protracted and the weather more severe, greater consideration had to be shown for the troops, and a wider space devoted to cantonments. (See the Distribution Table at the end of Chap. III.)

In order not to diminish the defensive power by this measure, orders were issued from headquarters, on the 4th of October, to have strong positions, secure against surprise, constructed in the first line of defence, in which single battalions, supported by guns, might hold out against superior forces until assistance should arrive. Each Army Corps was accordingly instructed to proceed with the construction of some secure closed works, or in putting suitable buildings into a state of defence.

The construction of these works, each containing shelter-places, was at once taken in hand on most of the fronts, and in spite of frequent attempts by the enemy to interrupt the works by artillery fire, they were carried on continuously as far as the strength of the troops would allow.

This was perhaps the most trying period of the whole investment for the Pioneer companies, who had to carry out the task given them with immense exertion, under continual rain, and with most unfavourable conditions of ground. During this period numerous works were thrown up, and, in all important particulars, completed before the capitulation, especially in front of the 3d Division of Reserve, and of the X., VII., VIII. and II. Army Corps.

On the 14th of October, the Commander-in-Chief intimated an intention of giving over 8 to 12 rifled 15-c.m. guns (24-pounders) for the use of the army, which, from suitable positions in the line of investment, could open fire, not merely on the large camp behind St. Julien and in the Moselle valley, but also on the suburbs and villages in rear occupied by the enemy, without exposure to their fire in return.

This proposition was at once followed up, and orders given to bring up ten long 15-c.m. guns, with 100 pounds per gun. Part of these were placed in the batteries before the completion of the capitulation.

As the season went on, the advanced posts, as well as their sup-

ports, were gradually provided with places of shelter* over a more extended front, and the work of the troops was repeatedly supplemented by that of the Pioneers. In several cantonments, the latter sunk tube-wells in order to procure better drinking water, but generally without satisfactory results, owing to the state of the ground.

In Metz, in the meantime, misery and want was daily increasing. According to the unanimous testimony of a great number of prisoners and deserters, on the 19th of October the average strength of the companies of Infantry was about 50 men. The Cavalry had only about from 15 to 20 horses per squadron left; the Corps Artillery had only 2 guns hored per battery, while the Divisional Artillery was completely disbanded. The daily rations were already reduced to the uttermost.

Discipline began to get slacker; men left their posts to seek anything eatable in the fields, and desertions increased.

As early as the 10th of October the Marshal called a Council of War, which determined to give up the useless though bloody foraging expeditions, and commence negotiations. Should the conditions be such as could not be accepted, then it was decided to make another desperate effort to break through.

As the proposition for neutralizing the Army of the Rhine, made by the French, could never be accepted, the Commander-in-Chief was quite prepared for another attempt at breaking through by the whole army, or at least by single divisions.

The greatest watchfulness was therefore enjoined on all the troops, and the outposts were directed, in case of serious attacks, to fall back on their positions. These were not to be given up under any circumstances, and to be held to the last man.

While the negotiations were still in hand, the 4th Division of Infantry was, on the 24th of October, detached for the Investing Army of Paris, so that the 3d Division had to cover the whole of the front hitherto occupied by the II. Army Corps.

During this last period the exertions of the Investing Army were strung to the highest pitch. At the same time the weather got worse and worse. The Moselle rose very considerably, and destroyed the trestle-bridges at Novéant and Talange (which had

* The proposition made by different Engineer officers at the very beginning of the investment, to bring up materials and workmen from the interior for the rapid construction of numerous barracks for the troops of the first line, broke down on account of the deficiency in rolling-stock on the only available line of railway.

been constructed out of improvised materials), while the boat-bridges were only kept afloat by the unremitting exertions of the Pontooneers.

As Marshal Bazaine's demands were definitively refused on the German side, he saw himself, on the 25th of October, obliged to enter into negotiations for a capitulation, which were concluded two days later.

In consequence of this capitulation,* the following fell into the hands of the investing army, viz. :—

173,000 prisoners (of whom about 15,000 were sick and wounded).

Among these were :—

3 marshals, 50 generals, 6000 officers, 53 colours, 66 mitrailleuses, 541 field guns, 800 garrison guns, 200,000 small arms, and an immeasurable quantity of other *matériel* of war.

The Engineers had their work in taking possession of the forts, as before the entry of the troops, the powder-magazines, mines, etc., were most carefully examined by Engineer officers. Thus the officers of the IX. Corps inspected Fort St. Quentin ; those of the III., Plappeville ; of the I., St. Julien ; of the VII., Les Bords ; and those of the VIII., Queuleu.

As the VII. Army Corps were directed to occupy Metz, the first Engineer officer of the Corps (Major Treumann) undertook the duties of Fort Engineer (*Platz-Ingenieur*), having under him, temporarily, the Pioneer companies of the VII. Corps, as well as the 3d Garrison Pioneer company of the IX., for the purpose of putting the fortress in a state of defence.

The armament was at once commenced, and the united energy of all concerned soon resulted in giving great defensive power to that fortress, which is of such immense importance to the protection of Germany.

In the meantime the VII. Army Corps soon left the fortress, the 14th Division of that Corps to besiege the Ardennes fortresses, and the rest moving off in the beginning of December towards Chatillon-sur-Seine.

From that time forward the fortress was held almost exclusively by Landwehr troops.

* During the investment of 70 days (reckoning from the 19th of August) the blockading army had lost by death on the field of battle and in hospital 102 officers and 2177 men. This was the price of the great result.

CHAPTER III.

DETAIL OF THE WORKS OF THE INVESTMENT.

IN order to get a general idea of the gradual development of the works of the Investment, the ground before Metz may be divided into the following sections :—

- (1.) The position from the Moselle to the Châtel ravine.
- (2.) From the Châtel ravine to Norroy.
- (3.) From Fêves by Semécourt to Amelange.
- (4.) From Malroy to Charly.
- (5.) From Failly by Servigny and Noisseville to Montoy.
- (6.) From Coiney to Ars Laquenexy.
- (7.) From Mercy-le-haut to Marly.
- (8.) The position on the left bank of the Seille to the Moselle.

I. THE POSITION FROM THE MOSELLE AT VAUX TO THE GORGE OF CHATEL.

Description of the Ground.

The principal part of the position is formed by the plateau of Amanvillers-Point-du-Jour, where the valley of the Moselle joins. The latter is throughout flat, about 400 paces wide, and only partially covered with plantations of trees. In the valley, at about 7000 paces from Fort St. Quentin, lies the manufacturing village of Ars, the northern boundary of which offers a good defensible line.

The plateau Amanvillers-Point-du-Jour is about 1500 paces wide, and is bounded by steep slopes covered with thick woods and vineyards on the east, west, and south. On these sides it is difficult to approach. The wood of Vaux, on the south, is

extremely thick, and scarcely passable,—the few roads leading through it are narrow and bad, running mostly along narrow hollows, which would render it exceedingly difficult to widen them. The only road passable for all arms leads from Ars, through the defile of Mance to the village of Gravelotte on the western slope of the plateau, and then on across the ravine of Mance to St. Hubert and Point-du-Jour.

On the eastern side of the plateau there are several ravines rising more gently, particularly at Vaux, Rozérieulles, Longeau, and Châtel.

The road from Metz to Verdun runs through the valley of Rozérieulles, and an old Roman road passes up the ravine which rises from east to west, westward of Longeau.

A narrow road runs also through the ravine of Vaux to the heights, where it forks, one branch turning northward, and the other southward to the defile of the Mance, thus affording a communication that cannot be looked into, between Ars on the Moselle and Vaux, but which is not well suited for the passage of troops of all arms.

Through the ravine of Châtel, which lies in front, runs a paved road and the still incomplete railway from Metz to Verdun by Amanvillers.

Between these ravines stand sharply-defined hill-spurs rising above a lower terrace, on which stood the villages of St. Ruffine, Jussy, and Rozérieulles.

The spur northward of Vaux was a most important position, as from it could be seen the villages of Lessy and Longeau, Sey, Moulins-les-Metz, Longeville, the whole plain of the Moselle, with the island of Symphorien and the plateau of St. Privat.

The village of Vaux was almost entirely hidden from the enemy's view, but, on the other hand, large bodies of troops approaching it by the ravine of Vaux from the plain of the Moselle would be quite within his sight.

A very steep stony road, almost impracticable for wheeled vehicles, leads northward from Vaux on to the spur of the hill.

The plateau itself is almost bare, the ground stony, and the solid rock rising to within 0·3 to 0·5 metres of the surface.

Fort St. Quentin almost completely commands the plateau; but covered positions for the Reserves could be found in the wood and ravine of Vaux.

Occupation by the Troops.

From the 19th of August the 13th Infantry Division stood on the right wing ; parts of the II. Army Corps on the left.

From the 23d of August the right was held by the 13th Infantry Division as far as Vaux, the left by the whole VIII. Army Corps.

From the 27th of August the 13th Infantry Division was on the right, and one division of the VIII. Corps on the left. The other division was moved to the plateau Amanvillers-Plappeville.

From the 5th of September, on the right, as far as the spur north of Vaux, were posted parts of the VIII. Army Corps ; on the left of this the IX. Army Corps.

From the 1st of October parts of the II. Army Corps held the right ; on the left stood the IX. Corps.

Defensive Works.

The front line rested on the Moselle eastward of Vaux, passed through Jussy to the heights, then followed the edge of the plateau as far as 700 paces northward of the ruin of Châtel, and then crossed the ravine of that name.

The first works thrown up formed a kind of bridge-head, and were carried out on the 19th of August by the II. Army Corps in front of the defile at Point-du-Jour. This was joined by the works thrown up during the night between the 19th and 20th August, by the 2d and 3d Field Pioneer companies of the VII. Army Corps, consisting principally of shelter-trenches in the Bois de Vaux.

On the 20th and 21st of August the 1st and 2d Field Pioneer companies of the II. Corps put the ruins of the farm-steadings of Moscow, Point-du-Jour, and St. Hubert into a state of defence, and began to cut down timber and form an abattis on the edge of the wood which covers the hill-side (falling towards the ravine of Châtel), throwing up shelter-trenches behind it.

On the 22d of August these same companies began to construct a timber barricade (*Schleppverhau*) from 20 to 30 paces wide across the ravine of Châtel, to block the road and the railway. Shelter-trenches were made for the picket stationed in the valley, and the front was cleared for some distance.

On the 23d the VIII. Army Corps took up the position till then occupied by the II. Corps. Before describing the works undertaken

by the VIII. Corps, it may be well to see what was done on the right wing of the position by the VII. Corps.

At first the 13th Infantry Division intended to take up its main position in the Bois de Vaux. It was therefore necessary to prepare the northern and eastern margins of the wood, to throw up some shelter-trenches for the protection of the hill-spur of Vaux, and to close the valley of the Moselle northward of Ars. These works were carried out on the 19th and 20th of August. A close reconnaissance showed, however, that the greatest care should be taken to keep possession of the hill-spur north of Vaux, and that the front defences of the plain of the Moselle could be flanked from a position taken up on the eastern declivity of the Bois de Vaux.

To carry out these views, work was begun on the 21st of August by the 2d Field Pioneer company of the VII. Army Corps, directed by Captain Goetze, and continued without interruption till the 5th of September. In the beginning two or three battalions of Infantry were employed daily, but after the 27th of August scarcely any other than French civilian workmen were obtained.

The hill-spur of Vaux was first crowned on its northern and eastern sides by shelter-trenches in two tiers. Altogether about 2500 paces of trenches were thrown up.

On the 21st of August a redoubt of sunken profile was begun on the north-eastern corner. It was intended to contain one company, and was provided with splinter-proof cover. A few days later a traversed battery for 6 guns was thrown up facing the east.

On the 22d and 23d, Fort St. Quentin fired heavily on these works from a distance of about 4500 paces, and the work had to be stopped for a short time.

On the eastern declivity of the Bois de Vaux a redoubt of sunken profile, and secure against a sudden attack, was thrown up on a prominent hill-spur at a place called the Hermitage. It was intended for 2 *zugs** of Infantry or 4 guns. From this redoubt, which hung like a swallow's nest on the hill-side, the whole valley of the Moselle could be commanded to a great distance. Other emplacements, thrown up further southward, afforded a second position for guns.

The plain of the Moselle was commanded by a battery for 4 guns built across the high-road to Metz. On its right, this bat-

* A *zug* is a subdivision of a company; the battalion contains eight *zugs*.—(*Translator's note.*)

tery was connected with the Moselle by shelter-trenches, and a breastwork of sunken profile rose on the left to the foot of the declivity. A covered communication joined this line with the fortified boundaries of the village of Ars-sur-Moselle, where large massive buildings were prepared for defence.

The bridge over the railway was closed against Infantry attacks by a barricade 3 metres high, made of rail irons, with a passage covered by a traverse. In front of this, on the right bank, a deep *coupure*, provided with a light abattis at the bottom, was made across the railway embankment. Shelter-trenches right and left covered the approach to the bridge from the plain of the Moselle.

Emplacements for guns were erected further to the rear, one of which was on a clay-hill about 8 metres high, lying eastward of the railway station of Ars-sur-Moselle.

Many military roads were constructed through the woods and vineyards connecting the several positions, particularly between Ars-sur-Moselle and Vaux and the neighbouring heights.

In the valley of the Moselle the front was cleared to a considerable distance, and the material thus procured was converted into an abattis flanked by shelter-trenches, and stretching from the Moselle to Vaux. Jussy itself was only weakly occupied, and was not intended to hold out against a very vigorous attack, so that only the village and park boundary were fortified.

Finally, when the works of the front line appeared sufficiently advanced, a position was created for the supports on the heights of Ancy, south-west of Ars.

After the II. Corps was moved towards the left, the VIII. Corps occupied the left wing of the position of Vaux, and began at once to strengthen the position. Directed by Lieutenant-Colonel Schultz, the 3d Field Pioneer company (Captain Richter) threw up defences between the ground occupied by the VII. Corps and the high-road. The 2d Field Pioneer company (Captain Eichapfel) extended the line to the old Roman road; the 1st Field Pioneer company under Captain Kallmann, taking the ground from this point to the farm of Moscow.

The advance of the enemy was to be impeded by strong abattis across the roads and along the edges of the woods, and behind these obstacles deep and wide-spreading lines of shelter-trenches, interspersed with batteries, were to be erected. Batteries were constructed to the north and south of Point-du-Jour.

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Most of the works thrown up by the II. Corps were made use of, but some were altered, and some destroyed.

On the 21st of August the construction of an extensive line of shelter-trenches was commenced, 1000 paces in advance of Point-du-Jour. The ditches bordering the high-road from Metz to Verdun were also prepared for defence, and the road itself barricaded.

On the 24th of August work was commenced on a demi-redoubt for six guns. It had 80 metres of crest-line, and the gorge was closed with a breastwork.*

This work was placed on the prolongation of the ravine of Rozérieulles, about 1000 paces west of the village of that name, and was intended to fire down the ravine. The construction was exceedingly difficult, the material being almost altogether rock-splinters. It was not finished till the 5th of September, having cost four hours' work of 17,500 men.

The 2d Field Pioneer company of the VIII. Army Corps built a row of shelter-trenches each 150 paces long, with intervals of 50 paces. The middle portions of these shelter-trenches were widened out. Epaulments to cover the supports were thrown up 150 paces in rear. The French works were levelled, and the defile of Rozérieulles closed with an abattis.

During the night of the 23d of August a shelter-trench, 150 yards long, was thrown up on the heights of Rozérieulles, immediately behind the park (Lieutenant Hesse). It was lengthened during the following nights, and the wood cleared or cut down for abattis. Besides this, several shelter-trenches were constructed to command the ravine of Longeau (the Roman road).

On the left wing the 1st Field Pioneer company of the VIII. Corps began also to throw up shelter-trenches westward of Châtel and eastward of Moscow.

An abattis was constructed along the edge of the wood in front, and in the ravine running down westward from Châtel, also down on the eastern declivities northward of Châtel as far as the bottom of the ravine of Châtel-Amanvillers, joining the abattis constructed by the II. Corps.†

* After the 28th of August this work was handed over from the 3d to the 2d Field Pioneer company. The work had the normal profile, viz., parapet, 2·25 metres high and 5 metres thick ; and the ditch, 3 metres deep.

† A portion of these works were carried out by the 3d Garrison Pioneer company of the

On the 27th of August the farms of Moscow, Point-du-Jour, and St. Hubert, which had been fortified by the II. Corps, were still further strengthened. Openings in the outer walls were closed up, loopholes were made, palisade tambours were built, shelter-trenches thrown up, etc., and a military road, winding three times, was made leading into the ravine of Châtel.

On the 5th of September the VIII. Corps moved towards the right, so as to occupy only the right of their old position as far as Vaux.

The only work carried out here by the 2d Field Pioneer company of the Corps was to continue the building of the redoubt begun by the VII. Corps, the drainage of shelter-trenches, and smaller repairs.

The IX. Corps occupied the centre and the left wing. By it the so-called Rock Redoubt (*Stein-schanze*), which had been thrown up by the VIII. Corps, was given a cloak of about 1 metre of earth, and arranged solely for defence by Infantry.

This alteration cost much time, and was carried out by the 3d Field Pioneer company of the IX. Corps under Captain Schulz. Earth was obtained by scraping the surface over a considerable area and carrying it. Close to this redoubt a battery was built to contain 10 12-centimetre guns, to command the valley of Rozérieulles and the Gravelotte road.

The Grand-Ducal Hessian Pioneer company under Captain Brentano undertook to strengthen the works which had been thrown up on the hill-spur northward of Vaux, and more splinter-proof cover was provided in the redoubt. On the 24th of September Fort St. Quentin fired again on this work, but without producing any result.

On the same day, at the request of the 18th Infantry Division, the village of Rozérieulles, which was occupied by a battalion, was arranged for defence by a detachment of the 2d Field Pioneer company of the IX. Corps and a company of Infantry. On account of the heavy fire of the enemy the work had at first to be carried on only by night. These works, which were repeatedly interrupted by patrols of the enemy, consisted only in fortifying the street and the edge of the village nearest to the enemy, and in the con-

II. Army Corps (Captain von Braunschweig). This Company had arrived at Metz at the end of August, and was attached to the VIII. Corps. Later on it was attached to the III. Corps, and, before the termination of the investment, to Kummers Division.

struction of cover to protect the outposts and to facilitate the passage of the reliefs, as it was not intended to hold the village if strongly attacked. Châtel St. Germain was also occupied in order to secure the excellent water found there for the use of the troops.

As the IX. Corps considered it necessary to be able to hold Jussy against any attack, the Hessian Pioneer company began on the 11th September to place the village and garden of the Château in a state of defence.

The 2d and 3d Field Pioneer companies laid down a quantity of metalling on the existing military roads, and constructed new roads from the bivouacs of the Infantry through the wood of Vaux to Ars and Vaux.

No large alterations were taken in hand in October, but the abattis on the high-road south of Rozérieulles, on the heights west of this place, and in the ravine leading to Longeau, were continually added to, and shelter-trenches constructed on the ridge north-west of Châtel in the Bois-de-Châtel.

Finally, a small battery for two 12-centimetre guns was thrown up near Jussy. Bomb-proof covers were erected over the guns, to protect them against the commanding fire of Fort St. Quentin.

Thus it appears that the level ground on the right wing of the position, which would have enabled the enemy to develop a strong attacking force, was protected by several rows of abattis and lines of works of the nature of siege-trenches, which, aided by the numerous artillery placed on the heights, on both banks of the Moselle, must have made any attempt to break through, along the valley of the Moselle, appear nearly hopeless.

The narrow defiles existing in the centre and left wing of the position made any development of the enemy's forces on that part exceedingly difficult, and as these defiles were thoroughly barricaded, and raked from end to end by the fire of several batteries, the loss to the enemy must have been fearful before he could be in a position to operate against the principal position on the edge of the heights of Jussy and Rozérieulles. These latter were mostly too strong to be taken by a rush, and the widely extending shelter-trenches gave scope for a very strong Infantry defence.

It must not, however, be overlooked that the position on the heights was partially commanded by the plateau of St. Quentin, and that a vigorous and stubborn defence of the fortified villages

of Jussy, Rozériculles, and Châtel against an attack in overpowering force would have demanded heavy sacrifices.

It would however have required only a small force to hold the heights westward of these villages, on account of the great strength of the defensive works. The special reserves would have found full protection against the fire of the guns of the fortress in the several miles of trenches, and the chief reserves could get cover in the Bois-de-Vaux, and on the slopes of the ravine of Mance. The numerous newly made communications would have enabled the reserves to reach the fighting position speedily, and without possibility of delay.

II. POSITION FROM THE RAVINE OF CHATEL TO NORROY.

Description of the Ground.

The position crosses the plateau Amanvillers-Plappeville about 2500 to 3000 paces in front of Fort Plappeville, passes down into the ravine of Saulny, and then runs eastward, half way up the heights towards Villers-les-Plesnois and Point-de-Jour.

In this section of the general position the ground is mostly covered with thick woods, which cramp the movements of both combatants. On the western slopes of the plateau of Plappeville is the Bois de Châtel ; on the eastern slopes, the Bois de Saulny ; farther on, near the high-road from Metz to Briey, the Bois de Chesnois, and the Bois de Plesnois. The farms of St. Maurice and St. Vincent lie on the open part of the plateau of Plappeville, formed by clearing the Bois de Lorry.

In front of the right wing lies the naked stony plateau on which Fort Plappeville stands, while a wide view of the plain of the Moselle northward of Metz can be had from the centre and left wing, except where it is shut out by buildings or woods. The position crosses the important road leading from Metz to Woippy and Briey, which, after passing Saulny, runs almost entirely through a defile.

Besides this one, two other roads lead up to the heights by Plappeville and Lorry, but they both pass through woods and narrow ravines, so that, although good enough for marching, they are quite impassable for troops who have to fight their way.

After the loss of the positions of Amanvillers and St. Privat-la-Montagne, which was the natural offensive bridge-head to these

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defiles, any attempt to penetrate from the front with large masses of troops had but small chances of success. The first thing therefore to be attended to, in the way of works, was to make the investment quite perfect, and to improve as far as possible the faulty communications within the position.

Occupation.

From the 20th of August, the II. Corps.

From the 27th of August, parts of the VIII. Corps.

From the 31st of August, parts of the VIII. Corps on the Plateau of Plappeville, and parts of the X. Corps on the left wing beyond Saulny.

From the 5th of September the III. Corps.

Works of Defence.

The first works of defence in this section were begun under the direction of Major Sandkuhl, commanding the Engineers and Pioneers of the II. Army Corps, under whose orders were placed, in addition to the 3 Field Pioneer companies of the II. Corps (von Wissmann, Grethen, and Balke), the 2d and 3d Field Pioneer companies of the Guards (von Spankeren and Jordan), and the 3 Field Pioneer companies of the III. Corps (Kuntze, Bredau, and Thelemann, I.)

The 3d Infantry Division, to which the Pioneer companies of the II. Corps were attached, occupied the right, the plateau of Plappeville, while the 4th Infantry Division and the other Pioneer companies held the left of the position from Saulny to Norroy.

Position on the Plateau Amanvillers-Plappeville.

The works of defence were begun on the 20th of August (under the immediate direction of Captain Grethen) by the 1st and 2d Field Pioneer companies of the II. Corps. The first thing was to prepare the Bois de Châtel for defence, and to construct an abattis through it, and this was done under the fire of Fort Plappeville, which was about 2500 paces distant.

On the 24th of August shelter-trenches about 550 paces long were established across the plateau joining the Bois de Châtel to

the Bois de Saulny, and the edges of the woods were cut down for a distance of 100 paces. Behind St. Maurice, and nearly parallel with the paved road from Plappeville to Amanvillers, a clearing, 10 paces wide and about 800 paces long, was cut through the wood to serve as a line of communication.

On the same day Captain von Wiszmann and a working party of men belonging to the 1st Field Pioneer company of the II. Corps, and 2 companies of Infantry, began a battery for 10 rifled 12-centimetre guns, secure against a *coup de main*, on the plateau in rear of the above-mentioned shelter-trench, at a spot screened by a projecting corner of the wood from view of the enemy. The trace was that of a demi-redoubt; the crest was 115 metres long; it was surrounded by abattis, and protected on each flank by shelter-trenches. The ditch could only be made 0·5 metres deep* owing to the unfavourable nature of the ground, but later the battery was finished off with a good covering of earth. To establish a connexion with the neighbouring positions on the right and left, an abattis was laid down on the slope of the heights, and new roads were made through the wood, the old roads being widened and improved.

Position from Saulny to Norroy.

The Commander-in-Chief had decided that the village of Saulny, which lay exposed to the fire of Fort Plappeville, and the brick-yard on the south side of it, were to be occupied and strengthened. Accordingly the high-road on the east of Saulny was closed by a strong barricade, and all openings in the boundaries of the village were filled in by abattis, with here and there an intervening shelter-trench. Half-way up the hill, in the Bois de Chenois, and protected by the Bois de Vigneulles, which projected far forward, a battery was built for 12 guns; the heights northward of Saulny were crowned by a shelter-trench; and, finally, the ravine of Saulny was brought under fire and barricaded in several places.

On the 25th of August the investing line was pushed forward to Villers les Plesnois and Point-du-Jour by order of the Commander-in-Chief. Both places were to be made defensible, and connected with one another and with Saulny by an abattis.

* This battery was never armed, the guns intended for it having been placed in a battery near Amanvillers.

Captain von Spankeren, with the two Guard Pioneer companies under him, carried out the works for defending the village of Saulny and the neighbouring brick-yard. These were then connected with the heights northward of Saulny by a large abattis flanked by shelter-trenches. More shelter-trenches and 500 paces of abattis were also constructed in the ravine running off from the plateau of Plappeville. On the 22d of August Fort Plappeville endeavoured several times to interrupt the work by firing on the working parties, but without effect.

The 2d Field Pioneer company of the III. Corps (Bredau), and a daily working party of 2 battalions of Infantry, had in the meantime built the above-mentioned batteries in the Bois de Chenois, and constructed several lines of communication in rear, as the high road could not be used, being in many places exposed to the enemy's fire.

The 3d Field Pioneer company of the III. Corps (Thelemann, I.), began to fortify Plesnois and Norroy, but left the work unfinished, the investing line having been pushed forward to Plesnois and Point-du-Jour, and the new position requiring immediate attention.

On the 27th of August the II. and III. Corps were moved westward, and consequently the Pioneer companies belonging to them left the work; but the Guard companies and the 3d Garrison Pioneer company of the II. Corps were placed at the disposal of the VIII. Corps, and remained behind, continuing the work as it had been begun.

After the 27th of August the VIII. Corps occupied the ground on each side of the ravine of Châtel. The first work undertaken by them was to construct a road leading from the ravine to the plateau of Plappeville, and their 3 Field Pioneer companies were employed in adding to the works begun on this wing by the II. Corps. Besides this, the farm of St. Vincent was fortified, and, in connexion with it, a supporting position was formed by digging shelter-trenches.

After the III. Corps had taken up the position which it continued to occupy till the end of the investment, Major Sabarth undertook the direction of the works of defence, having the 3rd Field Pioneer company of the III. Corps and the 3rd Garrison Pioneer company of the II. Corps under his command. First of all, the works actually in hand were finished, then the position of Amanvillers was fortified, and a battery for 10 rifled 12-centimetre guns was built

westward of Amanvillers by the 2d Field Pioneer company under Captain Bredau.

On the 9th of September the works of defence were begun northward of Montigny-la-Grange, and followed generally the line of the railway from Metz to Verdun to within 1000 paces northward from Amanvillers, the railway embankment forming the line of defence on the left wing, where it was connected with the village in rear. The village and the knot of houses on the north side of the railway were rendered defensible, the front of the position was cleared, and the embankment closed by traversed breastworks.

After the 20th of September the above-mentioned battery was converted into a square redoubt by a daily working party of 200 Infantry. Subsequently casemated traverses were provided, and extensive wire entanglements were laid down in advance to give security against a first rush.

Three lines of signal telegraphs were established to unite the several brigades of the Corps.

Furthermore, by direction of the General commanding, two blockhouses, to contain 100 men each, were prepared to strengthen the positions of the advanced posts. One blockhouse was to be placed on the plateau of Plappeville, and the other southward of the road from Saulny.

Beside the above, the following works were taken in hand :—

On the Plateau Plappeville-Amanvillers.

Six gun-batteries were prepared by the 3d Field Pioneer company at 4500 paces from Fort Plappeville, intended to command the road from Saulny to Woippy by means of openings to be cut through the wood. A battery was constructed behind the quarry on the north-east of Amanvillers with the same object.

In connexion with these batteries a line of shelter-trenches was begun, and carried across the plateau; the northern line was also completed and pushed forward to within 2500 paces of Fort Plappeville.

In October the defences of St. Maurice were strengthened, and the number of batteries increased.

Between Saulny and Norroy.

Several works were undertaken on this position after the fight of the 7th of October. The north-western edge of the wood of Woippy, which had served the enemy by masking his movements, was cut down, and several trenches, which had been used as cover by the enemy during the fight, were filled in with trees. The brick-yard on the east of Villers-les-Plesnois was converted into an independent post for one company, and a supporting position was established behind it. Finally, the defensive works at Villers-les-Plesnois and Point-du-Jour were improved by the construction of traverses on the long faces liable to enfilade.

Thus the position consisted of :—

(1.) A continuous line of broad impassable abattis, broken only here and there by shelter-trenches ; on the left wing the strong posts of Saulny, Villers-les-Plesnois, and Point-du-Jour. These places were to be considered as advanced posts. A prolonged occupation of Saulny was not intended, as that village lay under the concentrated fire of the guns of the fortress, and was meant to protect the line of pickets which followed the direction of the ridge. Villers-les-Plesnois, on the other hand, was intended to be held as long as possible.

(2.) On the right wing, on the plateau of Amanvillers-Plappeville, several lines of shelter-trenches connected with the fortified farms of St. Maurice and St. Vincent, and a battery secured against a sudden attack, beside several positions for guns hidden behind patches of wood.

(3.) Behind the centre at Saulny a row of shelter-trenches and numerous epaulments for guns to throw a concentrated fire on the outlet of the pass. The guns behind St. Maurice and at the quarry of Amanvillers could take part in this fire.

(4.) Numerous lines of communication, mostly of recent construction, which facilitated the movement of the troops both from the rear to the first line of defence, and also to the advanced line.

(5.) Finally, as a main position to oppose a large sortie, the line from Montigny la Grange by Amanvillers to St. Privat la Montagne, which was perfectly suitable ground on which to accept battle against the whole force of the enemy. As this position lay well to the rear, out of range of the artillery of the fortress, a well-

timed advance of the Corps occupying the neighbouring positions on either hand would most likely prove fatal to the army making the sortie, whereas it would have been impossible to have held the more advanced positions without heavy losses, particularly since the peculiar nature of the ground rendered it very difficult to outflank the attacking party, and would not permit of a rapid deployment of the defending force. In case of mishap, also, the enemy would have been able to find shelter in the ravines, while the fire of the fortress would have made pursuit impossible.

III. POSITION AT FÈVES, SEMÉCOURT, MAIZIÈRES, AND AMELANGE.

Description of the Ground.

The right wing of this position rests on the spurs running down from the heights on the left bank of the Moselle ; these are much broken up by undulations, and covered by the Bois de Woippy, and two patches of wood lying northward of it, thus affording cover, behind which the enemy's forces might assemble.

In front of the centre and of the left wing, the plain of the Moselle lies level and open for a distance of 2000 paces, the view being only interrupted by several farms. Immediately in front of the centre is the château of Ladonchamps, surrounded by wet ditches and woods ; to the westward of this lies St. Agathe, and behind St. Agathe, St. Rémy. In front of the left wing are the farms and villages of Franclochamps, Grandes and Petites Maxes ; further northward Grandes and Petites Tapes, all solidly and well built. To get at any of these places, however, it is necessary to cross open ground under the fire of Forts Plappeville and St. Julien.

Troops could be moved over any part of the ground, the only obstacle being the ditches which cut up the country in all directions, and this would be easily overcome. On the right wing the north-western offshoots of Horimont and the heights of Marange afford good positions for guns, from which a turning movement against the right wing could be easily checked, even if the villages of Saulny, Plesnois, and Norroy had been lost, since the difficult nature of the ground would prevent the deployment of large hostile forces.

Occupation.

From the 19th of August, the X. Corps.

From the 1st of October, the 3d Reserve Division; afterwards strengthened by the 19th Infantry Division.

Defences.

The villages of Fèves and Semécourt, the small wood of poplars on the west side of the railway, the churchyard of Maizières, and the farm of Amelange, were to form the principal points in the main line of the defence, and were to be joined by abattis and shelter-trenches.

In rear of this, Marange was to be fortified to protect the roads leading to the plateau of St. Privat la Montagne; the village of Maizières was to form a supporting position on the plain, and Hauconcourt was to act as bridge-head.

The Pioneers available for this duty were the 3 Field Pioneer companies of the X. Corps (Kleist, Meyer, and Lindow), the 2d and 4th companies of Saxon Pioneers (Richter and Friedrich), the 2d Field Pioneer company of the IX. Corps (Fiedler), and the Grand-Ducal Hessian Pioneer company (Brentano).

The works were started on the 21st of August; those westward of the railway were directed by Captain Meyer; the work lying east of the station by Major Klemm. Captain Meyer had the 2d and 3d companies of the X. Corps, the 2d Field Pioneer company of the IX. Corps, and 500 Infantry under his orders.

A line running through Bellevue, St. Catherine, and Point-du-Jour was selected for the positions of the outposts of the right wing, and made as secure as possible by fortifying the buildings and rendering the edges of the patches of wood defensible. The very exposed farm of St. Agathe was considered as a detached outpost and fitted up for defence.

The works of the main position were begun on the 31st August by fortifying the villages of Fèves and Semécourt.

Captain Fiedler fortified Fèves, the southern edge of which was most easily adapted for defence. The boundary of the village was prepared, the ground round about cleared for a considerable distance, and a battery for 6 guns was built in the re-entering angle

formed by Norroy, Fèves, Semécourt, by which the lines from Fèves to Norroy and from Fèves to Semécourt were well flanked.

These lines were principally composed of strong abattis which was here and there defensible by infantry.

As regards Semécourt, which was taken in hand by Major Meyer, only the western edge of the village was prepared for defence, the main line being advanced 600-800 paces up to the crest of the heights. A kind of bastion was thus formed, which gave good flanking defence to the line stretching from Semécourt eastward to the Moselle. The battery, which was built about 500 paces to the south of the village, had an open field of action over the whole plain of the Moselle in front.

On the 2d of September a battery for 10 rifled 12-centimetre guns was begun on the heights north-east of Semécourt. Two powder-magazines and two blindages were constructed in the battery, and much timber was cut down to clear the field of view.

In the meantime the Grand-Ducal Hessian Pioneers had constructed military roads through the Bois de Silvange in the direction of Pierrevillers, and had prepared a supporting position at Silvange by constructing shelter-trenches and gun-pits, and clearing the ground in front. The company also removed the exceptionally strong abattis which the French had laid down between Malancourt and Rombas.

On the left wing Grandes and Petites Tapes were strengthened, but as this line appeared to the General commanding to be too much exposed, it was abandoned on the 22d of August, and the line from Maizières by Amelange, further to the rear, was selected.

The 2d and 4th companies of Saxon Pioneers began therefore on that day to fortify the villages of Amelange and Maizières, and to construct shelter-trenches from château Brieux to the farm of Amelange on one side, and to the Moselle on the other. The batteries lying between were erected by the Artillery. On the 24th and 25th of August 2 batteries were built by the Saxon Pioneers; one of these was placed between the railway and the churchyard of Maizières, and the other on the left wing near the Moselle.

During the night between the 25th and 26th the farms of Grandes and Petites Tapes, and the château of St. Remy were put into a state of defence by Lieutenant Seyfert, as the General had

directed the outposts to be pushed further to the front. Later on the farms of Ladonchamps, Franclonchamps, and Grandes and Petites Maxes, were put also into a state of defence, superior orders having arrived to occupy these exposed posts.

Particular care was taken to strengthen the position in front of Maizières, and, beside the Pioneers, a daily working party of 600 men was employed there. Earth was heaped against the church-yard walls to strengthen them, the ground was cleared all round, and four military roads were cut through the wood between Maizières and Amelange.

The whole position was defensible by the 27th of August, but the work was continued without interruption and the defences were improved throughout, military roads and epaulments being constructed, so as to bring up the reserves under cover.

In the beginning of September the Saxon Pioneers began to construct huts for the Infantry, and on the 5th work was commenced on a supporting position behind Amelange.

Early in September a large battery for 10 guns was begun on the right wing to the north-east of Semécourt by Captain Meyer and the Pioneers of the X. and XII. Corps. Its front was protected by a flanked abattis, earth was heaped up forming a parapet outside the walls of the churchyard of Semécourt to strengthen them, and more gun-pits were constructed between Fèves and the 12 centimetre battery.

During the attack on the 27th of September the guns in the batteries north-east of Fèves and Semécourt prevented the further advance of the enemy, and all the positions were reoccupied in the evening. In consequence of this sortie the number of batteries was at once increased, and several new works were undertaken on the left wing, which however were interrupted by the Corps changing stations.

All this time, ever since the 22d of September, the 3d Field Pioneer company of the X. Corps, under Captain Lindow, had been engaged on the restoration of the railway between Maizières and Uckange, and of the branch line from Hagondange to Moyeuvre.

The piece of the line near Richemont, which had been destroyed, was at once restored, and a locomotive, found at Moyeuvre, and which the French had rendered unserviceable by the removal of several parts, was put into working order.

The telegraphs having been restored, regular traffic was opened

on both lines on the 1st of October, the Pioneers supplying the railway staff. The communication between the troops stationed before Thionville and the army investing Metz was thus rendered much more complete and easy.

On the 1st of October the 3d Reserve Division took up the position till then occupied by the X. Corps.

In consequence of the sortie made by the enemy on the following night, which rendered it necessary to abandon Ladonchamps, the three Garrison Pioneer companies of the IX. Corps (Graffunder), which had been attached to the Division, were directed to break up all the principal roads and the railway in front of the position, and to close them with abattis. They also broke down several walls in St. Remy so as to give a clear field for the action of the shelter-trenches behind them, and added to the obstacles in front of the different *points-d'appui*, such as wire entanglements, trous-de-loup, etc.

The X. Army Corps intended also to strengthen the defences of the position at Amelange and of the farms of Grandes and Petites Tapes.

These works were taken in hand on the 7th of October, but were stopped, as the Pioneer companies engaged on them were required to take part in the operations intended to be undertaken against Ladonchamps.

This operation was, however, in its turn thwarted by the French attack made about mid-day, which was crushed by the combined fire of all the guns in battery.

During the night of the 8th of October a supporting position consisting of shelter-trenches and 12 gun-pits was constructed northward of the two Tapes by the 2d Field Pioneer company of the X. Corps (Meyer), assisted by 400 Infantry, and at the same time the gorge-walls of the farms were opened by the 3d Garrison Pioneer company.

By directions from headquarters, 3 redoubts were also begun on the 8th of October, to increase the defensive power of the line Semécourt-Amelange. Each of these was intended to contain a garrison of 1 or 2 companies and 6 guns.

The 3d Field Pioneer company made use of a saw-mill at Richemont and prepared there the timber required for the construction of bomb-proofs for the redoubts. In the meantime the three redoubts were begun on the 10th of October, under the

direction of Captain Meyer, by the two Pioneer companies, and an average daily working-party of 1000 Infantry in two reliefs.

The redoubt at Maizières, which was first built, took eight days. Its crest-line was 220 metres long ; the ditch was 1·3 metres deep. It contained barbettes for 9 guns, 4 bomb-proofs of 19 square metres, powder-magazines, and a traverse on the capital.

The second redoubt was begun on the 14th of October ; it stood westward of the railway from Metz to Thionville. The third redoubt, situated south-east of Amelange, was begun on the 18th of October. Both of these had the same dimensions, and were arranged in the same manner as the first redoubt, and took the same time in building.

If these arrangements be critically examined it will be seen that a position, intended both for outposts, and as a first line of defence, was here taken up within 2000 paces of the enemy's works, and that to hold it would have required a great sacrifice, particularly if the enemy used his ammunition without stint.

On the other hand, the main position, against which the enemy might have advanced in large numbers, possessed a great and increasing strength, owing particularly to its retired position and to the development of a strong fire of field artillery and of artillery of position, the effect of which was largely increased by the power of co-operation possessed by the artillery in the neighbouring positions.

Finally, the line Marange, Silvange, Maizières, and Hauconcourt formed a very strong supporting position, which, with the main position, would have rendered a successful attempt on the part of the enemy to break through on the left bank of the Moselle exceedingly difficult, if not utterly impossible.

IV. THE LINE FROM MALROY TO CHARLY ; AND

V. FROM FAILLY TO SERVIGNY AND MONTOY.

Description of the Positions.

These positions are bounded on the west by the Moselle, and on the south by the Vallières brook, which flows from east to west.

Fort St. Julien stands in the south-west, at an elevation of about 84 metres above the Moselle, and is situated on a hill rising with steep sides between the Moselle and the Vallières.

In the deep valley of the Vallières brook lies Montoy, Lauvallier, Vantoux, and Vallières. The main ridge rises from Fort St. Julien, and along it the high-road runs in a north-easterly direction towards St. Barbe, at which point it reaches an elevation of 134 metres above the Moselle.

The large farm of Grimont stands on the ridge at a distance of 600 paces from Fort St. Julien. On the hill-side there is Villers l'Orme at 3500 paces, while Failly, Poixe, and Servigny are about 5800 paces from the fort. Nouilly lies in a valley formed by a streamlet which rises at St. Barbe, and falls into the Vallières brook. It has several branch valleys, and opens towards the southwest. On its southern side rises a peculiar range of hills, on the slopes of which lie the villages of Noisseville and Retonfay.

Northward of Fort St. Julien, on both sides of the chaussée, the ground falls gently towards Bouzonville, but towards the Moselle the descent is rather abrupt.

At Olgy the Moselle slope is intersected by a streamlet which rises at Villers l'Orme, passes the villages of Vany, Chieulles, and Malroy, and flows into the Moselle at Argancy.

Between Malroy and Argancy, nearly at right angles to the Bouzonville road, the hills rise in the direction of St. Barbe, and fall rather steeply from north to south. On their southern declivity lies the village of Charly, and on a southern spur the village of Rupigny. Between Charly and Vrémy stands the Bois de Failly, but elsewhere the ground is open.

Before Malroy the ground is mostly open and well seen, as it is also in front of the right of the position, extending from Failly by Servigny to Montoy, but the enemy might approach the left wing under cover from several directions. The reserves would find cover behind hills, folds of ground, woods, etc., especially on the right.

*Position of Malroy-Charly.**Occupation.*

From the 21st of August the 3d Reserve Division.

From the 1st of October the X. Army Corps and the 20th Division of Infantry.

Defensive Works.

The right wing of the position rests on the Moselle, the left wing on the Bois de Failly. It was reconnoitred on the 21st of

August by the Engineer staff of the First Army and of the I. Corps. It was decided to place the main position on the heights northward of the line from Malroy to Charly ; the works of the advanced position were to lie northward of Vany and Chieulles.

On the 22d of August the village of Malroy was fortified by the 3d Garrison Pioneer Company of the IX. Corps (Captain Graffunder), and one Infantry company. The work was under the direction of Captain von der Groeben. The southern and western boundaries were closed ; a banquette was made behind a ditch carrying off water towards the east, and provision was made to convert the church into a retrenchment.

Captain Neumann, with the 2d and 3d Field Pioneer companies of the I. Corps, began to fortify Charly on the 22d and 23d of August. Two lines of defence were constructed in the village, the outer line being the boundary of the village, while the inner line was formed by the churchyard wall and by connecting blocks of houses.

On the 22d of August, under the direction of Captain Neumann, a line of shelter-trenches, like a siege trench, was thrown up between Malroy and Charly, by men belonging to the 2d and 3d Field Pioneer companies of the I. Army Corps, and 4 Infantry companies ; and on the 23d of August more shelter-trenches and gun-pits, for 36 guns, were constructed in two lines, 500 paces apart, on the heights northward of the line from Malroy to Charly, and at right angles to the high-road leading to Bouzonville.

On the 24th of August 12 gun-pits for 12 pieces were added in the vineyard to the north of Malroy, and flanking works, as well as blindages for the limbers, were constructed on the following day.

A supporting position was made to the southward of Argancy by half a company of Pioneers and a battalion of Infantry, as well as a battery to command the left bank of the Moselle.

Finally, to protect the bridge at Argancy, a double bridge-head, consisting of shelter-trenches, was thrown up by the 1st Field Pioneer Company of the I. Army Corps and 2 companies of Infantry, under the direction of Captain von der Groeben : at the same time the construction of several military roads leading from the pontoon-bridge to the high-road of Metz and Thionville was taken in hand.

The position was further strengthened, after the fighting on the 31st of August and 1st of September, by the 3 Garrison Pioneer companies of the IX. Corps. Malroy was connected with the

Moselle, the fortifications of Rupigny were improved, and a row of shelter-trenches were thrown up in front of it, so as to bring the village of Chieulles within range, it having been occupied by both sides in turn.

When the position was occupied by the x. Corps, gun-pits for 18 pieces, and cover for the limbers, were constructed at Charly, on the evening of the 4th of October, by their 2 Field Pioneer companies.

According to directions issued from headquarters on the 5th of October, it was resolved on the 7th to build a redoubt to the westward of Charly.

The sortie, which was made on this day on the left bank, was accompanied by a demonstration against the line from Malroy to Charly, but the enemy's advance was stopped by the fire of the guns in battery.

The experience of this day's fighting showed that the first thing needed was to strengthen the front occupied by the 3d Reserve Division, which was attached to the x. Corps. The Pioneer companies of this corps therefore constructed here three redoubts, and it was not till the 24th of October that they began to build the redoubt at Charly. Two reliefs of 600 men worked daily at this redoubt from that day till the time of the capitulation.

Thus the following works had been constructed on this position :—

1. An advanced line at Rupigny.
2. A main position in two lines on the hills, having an extensive view, gently sloping ground in front, with its flanks resting on the strong *points-d'appui* formed by the fortified villages of Malroy and Charly. The plain of the Moselle at Ladonchamps was within range of the right wing of the second line, and positions for artillery were formed at Olgy, so as to bring a heavy fire in that direction.
3. A supporting position south of Argancy, behind which lay the bridge over the Moselle, protected by a double bridge-head, and having direct communication with the defensive position from Maizières to Amelange.

Reserves were posted, under cover, behind the heights and the Bois de Failly, and could be brought up, unseen by the enemy, behind the positions Malroy-Charly or Failly-Servigny.

During the investment, the communications, although already abundant, were added to in several places, more especially by the construction of numerous rough bridges over the small water-courses.

The line of outposts ran from Malroy by Rupigny towards Vany, which village was only occupied as a post of observation, while the neighbouring village of Chieulles was watched by patrols.

Thus the position of the outposts partly coincided with the main line of defence, and had therefore to be held by a relatively strong force, which was but badly protected against the artillery of the fortress.

In October, during the occupation by the X. Army Corps, a scheme was brought forward to remedy this by throwing back the main line of defence as far as Argancy and Antilly, but it was never carried out, mainly because it would have rendered the communication with the neighbouring position Failly-Servigny much more difficult.

Position of Failly-Servigny-Montoy.

Occupation.

At the beginning of the investment the 1st Infantry Division.

From the 3d of September the whole I. Army Corps (left wing in Coincy).

From the 10th of September the 1st Infantry Division.

From the 17th of September the whole I. Army Corps (left wing in Coincy).

From the 1st of October the whole I. Army Corps (left wing resting on the high-road to Saarlouis).

Works of Defence.

The work of really putting the position into a state of defence began on the 26th of August, when the line of Malroy and Charly had been taken up.

The work that had been done here and there by the Infantry was continued by the 2d and 3d Pioneer companies of the I. Army Corps; but on the 26th of August the enemy seemed to threaten an attack and delayed the work.

Between the 26th and 29th of August the village of Failly was put into a state for defence by the 3d Field Pioneer company, assisted by a working party of 500 men, and at the same time shelter-trenches were begun on the slopes to the south of the village.

Openings and weak spots on the boundary of the Bois de Failly were made good with abattis. Shelter-trenches were thrown up on the western and southern outskirts of the wood, and at all important points where a good command could be obtained over the ground in front, after it had been cleared.

At the same time the Pioneers of the I. Army Corps began to fortify the line Poixe-Servigny-Noisseville. These villages were prepared for defence, and shelter-trenches and batteries were thrown up on the heights.

The ravine between Servigny and Noisseville was closed by an abattis flanked by shelter-trenches, the ground in front was cleared, and a supporting position taken up in front of St. Barbe.

The steading called La Brasserie, which consisted of several solid buildings, on the road to Saarlouis, protected the left wing of the position. It was connected with the works at Noisseville by a trench for riflemen 600 paces long, behind which lay 6 gun-pits.

On the 29th of August the position was considered sufficiently strong, and work was stopped on the following day.

On the 31st of August the position was attacked, and the comparatively weak left was carried, the enemy having turned it by advancing up the Saarbrück road.

On the evening of the 1st of September the above named Pioneer companies, and the Hessian Pioneer company, were told off to add to the works, under the direction of Major Fahland.

During the first days of September shelter-trenches were constructed behind La Brasserie and Servigny, with the object of preventing the enemy debouching from these places and from the ravine between Nouilly and St. Barbe. Besides this, the ground was cleared and fougasses laid in front of Servigny and Noisseville, while shelter-trenches and gun-pits, with abattis in front, were constructed to protect the ravine.

It was intended to evacuate La Brasserie, which was to have been blown up, but the XIII. Army Corps having joined the investing force, it became possible to reoccupy this important post, and the 2d Infantry Division was placed in occupation of the line from Noisseville by Montoy to Coincy.

Consequently, between the 4th and the 7th of September, the fortifications of Noisseville and La Brasserie were strengthened, and several shelter-trenches were established at Montoy.

In the course of September these works were completed, and the

shelter-trenches were drained, but no really large alterations were undertaken.

In October, in order to strengthen their position from Failly to Servigny, the 1st Infantry Division threw up a half-sunken earth-work, with a crest-line 200 paces long, on the high-road northwestward of Poixe. Captain Riemann directed the work, which was carried out under a heavy fire from Fort St. Julien. The very unfavourable weather, and the fact that working parties could no longer be supplied, delayed the work so much that it was not completed till towards the end of October.

The 2d Infantry Division, occupying the front between Noiserville and La Brasserie, did not consider that any more defensive works were required, the entrenchment of Flanville by the VII. Army Corps having given considerable additional strength to the left wing. However, on the 21st of October a party of 450 men were set to work to throw up a half-redoubt, with a crest-line 200 metres long, across the high-road to the eastward of La Brasserie. This work was principally intended to bring under fire the ground between Vantoux and Nouilly, which would favour an attack by the enemy, but was never completed, on account of the unfavourable weather.

Thus a fairly strong position had been established on the line extending from Failly by Poixe, Servigny, and Noiserville, to La Brasserie, in which these several stations formed strong points, the intervals being occupied by shelter-trenches and gun-pits commanding the probable lines of advance of the enemy. The ground in front was cleared and laid open to the fire of the defenders. Shelter-trenches and gun-pits commanded the ravines which favoured the approach of the enemy, and a supporting work was thrown up behind this line to prevent the enemy debouching after taking the first position.

It is true that the villages in the main position were within effective range of the artillery of the forts,—also that the line occupied by outposts, which extended nearly due southward from Villers l'Orme to the heights in front of the villages of Servigny and Noiserville, and of the farm of La Brasserie, was on the whole faulty, as the ground between Vantoux and Nouilly enabled the enemy to approach the outposts under cover, and thus to keep the latter constantly on the alert.

If in spite of these defects the position was held till the end of

the investment, it was principally because we were unwilling to abandon the battle-fields won at such a sacrifice on the 14th and 31st of August. Beside this, the enemy did not fire much from the fortress, and therefore the villages were held without much sacrifice of life. If he had acted differently, and kept up a constant cannonade against the works of the investment along the line of Malroy, Charly, Servigny, and Noisseville, it would probably have been necessary to have taken up a defensive position more to the rear, about the line of Argancy, Antilly, St. Barbe, and Château Gros, from whence the artillery would have completely commanded the villages of Malroy, Charly, Noisseville, etc.

VI. POSITION FROM COINCY TO ARS-LAQUENEXY.

VII. FROM MERCY-LE-HAUT TO MARLY.

Description of the Ground.

Eastward of the stream between Aubigny and la Planchette, which was the general boundary between the positions of the French and Germans, the land rises and forms a sort of circular curtain round the detached posts, hiding on the east and south a great part of the ground in front from the view of the fortress. This sweep of hills is formed by the heights of Montoy, Aubigny, Mercy-le-Haut, St. Thiébault, and Marly. The Nied, which runs about $4\frac{1}{2}$ miles behind this position, forms a second line for the northern half of it, and on the southern half, the high ground which stretches between the Nied and the Seille, from Sorbey past Orny and Pournoy-la-Grasse, forms a retired position with great command over the ground in front. This is, however, covered by many patches of wood, obscuring the view and impeding the free movements of the defenders, while good communications and the formation of the ground offer great facilities to an enemy for developing an attack.

Behind the high ground from Coincy to Ars-Laquinexy lies the railway from Metz to Saarbrück, the most important etappen line of communication for the investing force.

The station at Courcelles, where for a long time the principal magazines were formed, is reached by the road from Metz *via* Grigy and Remilly, which with two other roads further south afford

great facilities for an advance of the enemy; and, as the ground is also favourable for deployment, it is evident that a properly organized attempt to break through the lines of the investment was more likely of success in a south-easterly direction than in almost any other.

Position on the line from Coincy to Ars-Laquenexy.

Occupation.

At the beginning of the investment this position was occupied by the 2d Infantry Division.

From the 3d of September by the 17th Division of the XIII. Army Corps.

From the 10th of September by the 2d Infantry Division.

From the 17th of September by the 13th Infantry Division, not including Coincy.

From the 1st of October by the whole VII. Corps, resting its right wing on the Saarlouis, its left wing on the Ars-Laquenexy road.

Works of Defence.

The first works were thrown up by men belonging to the 1st Field Pioneer company of the I. Army Corps, directed by Captain von der Groeben.

On the 28th of August works to strengthen the positions of the outposts at Colombey were begun, and the boundaries of the park were secured by abattis and shelter-trenches. The same was done at La Grange-aux-Bois in front of Ars-Laquenexy, and also on the 29th of August, for the main body of the Division, across the high-road from Grigy to Remilly, on the north-west of Laquenexy.

Similar defences were thrown up in front, and on the flanks of, the main position, with a view to protect the right wing from an attack coming from the direction of Marsilly.

Finally, on the afternoon of the 30th of August the farm of Champs, to the westward of Courcelles, was prepared for defence.

The events of the 31st of August and 1st of September having shown the weakness of the position, the works of defence were pushed forward much more vigorously after the 4th of September. Captain Ritter first fortified the heights between Montoy

and Coincy, and Captain von der Groeben erected works round the village of Coincy, which were joined to those thrown up by the XIII. Corps, and especially by the 17th Division, under the direction of Colonel Braun.

The proposed works could not be fully carried out because the newly-formed Corps possessed only a small number of Pioneers, and was without an entrenching-tool column.

In the beginning the only Pioneers attached to the Corps were the 2d Garrison Pioneer company of the IX. Corps (Reusner), but afterwards the 1st Field Pioneer company of the IX. Corps (Lilie) was added to the force.

The 17th Division strengthened the position at the salient and re-entering angles of the wood westward of Laquenexy, cleared the ground in front, established communications with the rear, and filled in the shelter-trenches which had been constructed by the French.

The 2d Division having resumed its old position after the departure of the XIII. Corps, made considerable additions to the defences of the front, the 1st Field Pioneer Company of the I. Corps having begun on the 12th of September to fortify Ars-Laquenexy and the chateau of Aubigny.

New dispositions were adopted when it became more probable that the enemy would attempt to break through in a southerly direction and attack Courcelles. To provide against this the VII. Corps occupied the ground as far as Ars-Laquenexy on the 17th of September, holding, in connexion with the 13th Division, the roads leading to Courcelles, where the Landwehr battalions of the General-Etappen-Inspection of the First Army were made available as a reserve.

Measures were immediately taken to strengthen the position at Ars-Laquenexy, where, directed by Captain Goetze, half of the 2d Field Pioneer company, assisted by a working party averaging one battalion of Infantry, were employed till the 1st of October.

It was not easy to make the position strong, as there were no natural obstacles, and the very woody nature of the country narrowed the field of action of the works which were thrown up, and prevented any distant view being obtained.

Besides, the chateau of La Grange-aux-Bois and the wood of Borny lay in front of the position, and of course reduced its defensive power very much. Every day the enemy annoyed us along

the whole front, both by attacking our outposts and by bringing heavy guns to bear on it.

During the sortie of the 22d of September the outposts had to evacuate La Grange-aux-Bois. The enemy then occupied the château, and from the upper stories enfiladed the road leading to Ars-Laquinexy. The château was therefore prepared for being set on fire, and a fire-party was attached to the picket stationed in it, to set fire to the building should it again become necessary to retire.

At about 1200 paces from the château a breastwork was thrown up across the road, and an abattis laid in front of it. The outskirts of the woods behind La Grange were cut down and partly prepared for defence, the working parties being constantly under fire while carrying out this duty. The outskirts west of Ars-Laquinexy were also strengthened, and shelter-trenches similar to siege-trenches were constructed to join this village with the patches of wood lying to the southward.

As the latter afforded favourable positions in which the enemy might establish himself, openings were cut through them, so as to form independent positions, flanked by batteries built in rear.

On the 27th of September a sortie occurred on a larger scale, and La Grange-aux-Bois had to be evacuated suddenly, but the Pioneers were able, after the retreat of the picket, to set fire to the buildings.*

The château of Colombey was also lost on this day, but in the evening it was again occupied by our outposts, after having been set on fire by the artillery of the I. and VII. Army Corps.

During the night between the 27th and 28th of September, Lieutenant Groening and some men belonging to the 2d Field Pioneer Company threw up a shelter-trench 400 paces long, and traced *en crêmaillère*, enabling the rifle-picket, which was established in the Bois de Borny, to the northward of La Grange, to push forward sentries under cover, as up to that time they had suffered daily losses.

The danger of the position at Courcelles became daily more evident, as the enemy made continual sorties against this front.

* In order to make sure, if necessary, of the complete destruction of the château, Captain Goetze had directed a mine to be prepared, which was however to be fired only after the enemy should have taken possession. The 2d Field Pioneer company of the VII. Corps was engaged laying the charges, calculated at 5 cwt. each, but the attack was made with such overpowering force that the work had to be abandoned.

The VII. Corps and the 2d Infantry Division agreed therefore to take up a position on the line from Aubigny to Ars-Laquinexy, instead of the more retired position which it had been intended to occupy across the road from Ars-Laquinexy to Courcelles, and to defend it to the death. Therefore, on the 29th of September, the 2d Field Pioneer company of the VII. Corps began to complete the defences of the château of Ars-Laquinexy, adding shelter-trenches northward of the road. Behind these, gun-pits were constructed, and signal-posts erected, so as to be able to give the alarm as speedily as possible to the villages in rear.

From the 1st of October the position was occupied by the whole of the VII. Corps, each division holding the front for eight days in turn, the other division being stationed behind in reserve.

The defences of the left wing were undertaken by the 1st Field Pioneer company of the VII. Corps, under Captain Junker, assisted by a daily working party of 400 Infantry.

The defences of the château of Ars-Laquinexy and of the position at Aubigny were strengthened, and the ground in front of La Grange-aux-Bois was cleared by cutting down about 500 trees.

On the 7th of October another attack was made on the château of La Grange, which had been burnt during the fight on the 27th of September. On this occasion an attempt was made by First-Lieutenant Foerster to destroy the walls with lithofracteur, but it had not the effect intended. However, the loud explosions deterred the enemy from further attack, and the outpost, whose retreat from the place had been fully prepared for, remained thereafter undisturbed.

On the 3d of October parties were set to work to cut down a small wood south of Colombey.

Two large redoubts were built to strengthen the centre by order of the General commanding. Their position and trace were determined by the officer commanding the 14th Infantry Division.

One redoubt lay northward of Coincy on the south side of the Saarbrück road ; the other eastward of the château of Aubigny.

Each redoubt had a crest-line of about 150 metres, and barbettes for 6 guns. The parapets were 3·75 metres thick, 2·65 and 2·5 metres high, and the ditches were 3 metres deep. The gorge was to be protected by a parapet 2 metres high ; the ditch round the front was to be palisaded and flanked by caponiers, and several bomb-proofs were to be constructed inside.

136 *Operations of the German Engineers and Technical Troops.*

The redoubt at Coincy was begun on the 8th of October by the 2d Field Pioneer company of the VII. Corps under Captain Goetze, who was afterwards replaced by First-Lieutenant Paulus. Constant alarms, bad weather, and the rocky and exceedingly difficult nature of the soil, delayed the work very much. It was also necessary that the redoubt should, on account of its position, be ready at any moment, even during the building, to resist an attack, and therefore the best methods of working to economize labour could not be attended to.

On and after the 12th of October the redoubt was fired on almost every day by Fort les Bottes, but without any effect, as the shots generally fell short. Altogether before the 27th of October we had twelve days' undisturbed work, employing 400 to 500 men per relief, in three reliefs, and obtained the following results:—relief of crest-line 2·5 metres, ditch 1·56 metres deep, gorge-parapet 1·7 metres high, gorge-ditch 1·4 metres deep. The bomb-proof under the salient was nearly finished, the wood for making the shelter-places under the gorge was at hand, and the palisades were ready, so that the work was already quite capable of defence.

The redoubt at Aubigny, which was thrown up by Lieutenant von Huene with the 3d Field Pioneer company of the VII. Corps (three reliefs of 450 men being employed), was carried on under similar difficulties. The soil was hard clay. The work was masked by the wood on the south side of Aubigny, which was to be cut down in due time.

On the 27th of October the redoubt had not been completed, but it was fully enclosed and capable of defence, and contained 65 square metres of cover under the banquettes.

At the same time the strength of the position was increased by the construction of three batteries, each for 6 guns, near the redoubt at Coincy, and southward of that village.

Finally, considerable additions were made to the defences of the village of Flanville, which the VII. Corps considered a post of the utmost importance. These were carried out by the 2d Field Pioneer company of the Corps during the month of October. On the south side of the village a battery was built to contain 6 guns, and a neighbouring vineyard, enclosed by high walls, was prepared for defence, the gorge-walls being levelled. Flanking works were constructed at several points round the village, and the ground in front extensively cleared.

Thus it appears that the following works constituted the defences of this section of the investing lines :—

(1.) In the extreme advance, Colombey and La Grange-aux-Bois, which were only occupied by pickets.

(2.) The main position, consisting of two lines of works, protected on the right wing by a deep valley. In the first line stood the brewery on the Saarbrück road, the château of Aubigny, and the wood in front of the village of Ars-Laquinexy ; in the second line the redoubts at Coincy and Aubigny, the château of Ars-Laquinexy, and a large number of gun-batteries.

(3.) Behind the right wing lay the independent post at the village of Flanville, and a position for guns in front of Ogy. A supporting position, covering Courcelles, had been constructed behind the left wing across the road in front of Ars-Laquinexy.

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On this account the possibility and advisability of removing the line of outposts further to the rear was debated, but no decision was ever come to on the subject, as the enemy always withdrew from the chateau of Mercy-le-Haut, La Grange, and Colombey shortly after having obtained possession of them, so that it was possible each time to reoccupy them without much loss.

Generally speaking, the position was weak by nature, but before the end of the investment it had been made so strong that any attempt by the enemy to break through our lines could be met without anxiety, as the numerous excellent lines of communication rendered it possible to send out reinforcements speedily from the rear and from the flanks.

Position from Mercy-le-Haut to Marly.

Occupation.

At the beginning of the investment this position was provisionally occupied by the 3d Cavalry Division, Mercy-le-Haut being the extreme post held by the 2d Infantry Division.

On the 27th of August the 28th Infantry Brigade was added to the above, and stationed at Pouilly.

Further on, the position required no artificial defence in front, being protected by a very steep bank about 20 metres high.

Northward of Pournoy-la-Grasse the line occupied jutted out to the front in the form of a bastion following the eastern edge of the Bois Sembrone, so as to flank the rest of the position, and was separated from the Bois des Veaux by very narrow openings. These intervals were widened out to about 200 paces, the edges of the woods being cut down and arranged so that the openings could be fully flanked by a battery, placed on their prolongations on the heights north-east of Pournoy-la-Grasse.

The edge of the Bois Sembrone was also defended by a continuous shelter-trench, protected by an abattis, and another shelter-trench connected it with the heights on its east.

In prolongation of the northern edge of Bois Sembrone an embankment stretched across the front of the clearing. It was made defensible, and formed a kind of bridge-head.

The line of defence there followed the northern and western edges of the Bois Sembrone, through which several communications were constructed, and was joined to the high-road of Nomény by a shelter-trench; which ran along the top of the slope. Emplacements for 6 guns were constructed on each side of the chaussée of Nomeny, commanding the whole ground in front.

Shelter-trenches connected these batteries with the Bois de Lamenée, the edges of which were also cut down and prepared for defence. Between the Bois de Lamenée and the Bois d'Avigny a battery for 12 guns was built, facing to the north-west, protecting the left wing, and commanding the valley of the Seille to a considerable distance.

In front of the Bois de Lamenée a ridge ran between the road and the Seille. It offered an advantageous position to the enemy, who would be able to reach it from Fleury under cover, through a dip in the ground. It was therefore crowned with a shelter-trench about 800 paces long, and connected with the Bois de Lamenée by a covered communication.

The entire extent of front of the position was about 8000 paces.

These defensive works were carried on between the 12th and 25th of September by one battalion of Infantry and the 2d Field Pioneer company of the VII. Corps, directed by Captain Goetze at first, and afterwards by First-Lieutenant Paulus.

The VIII. Corps took charge of the line of defence from Mercy-

le-Haut to Marly, on the 1st of October, and strengthened the positions in advance which had been occupied by the VII. Corps, by constructing new communications and widening the profile of the shelter-trenches. They also fortified the villages of Frontigny and Jury, not however doing much to the latter on account of its unfavourable position.

These works were carried out by the 2d Field Pioneer company (Captain Eichapfel).

On the 5th of October the 3d Pioneer company began to throw up a redoubt southward of the Chapel of Mercy-le-Haut, but it was not finished till the 28th of October owing to want of workmen. This work was constructed in the form of a demi-redoubt, and had barbettes for 6 guns, shelter-trenches on the flanks, and a covered communication leading to the wood in rear, the edges of which were rendered very strong.

The 1st and 2d Field Pioneer companies carried out the defensive works on the left. These consisted principally in improving the defences of Pouilly, which village was now considered the key of the position.

In addition to the emplacement for guns already existing at the eastern corner of the Bois de Pouilly, another was constructed behind the north-west corner, which could not be seen from Fort Queueuleu, and was able to flank the Bois de l'Hôpital.

On the 23d of October, to give still more security to the village of Pouilly, a battery for 3 rifled 15-centimetre guns was begun on its western side; it was got ready for action on the 27th of October, owing to the timely arrival of a company of Garrison Artillery.

It remains to be noted that on the evening of the 26th of October, the 1st Field Pioneer company completely destroyed the railway west of Crespy, by exploding a mine laid under both lines of rail.

The defensive works on this position consisted therefore of the following:—

(1.) The first line joining the VII. Corps at Ars-Laquinexy, consisting of the edge of the wood southward of Mercy-le-Haut, with a redoubt beside the north-west edge of the Bois de l'Hôpital, the north-western and western edges of the Bois de Pouilly, and the village of Pouilly with the 15-centimetre battery.

(2.) The line marked out by the villages of Frontigny, Chesny,

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The redoubt at Aubigny, which was thrown up by Lieutenant von Huene with the 3d Field Pioneer company of the VII. Corps (three reliefs of 450 men being employed), was carried on under similar difficulties. The soil was hard clay. The work was masked by the wood on the south side of Aubigny, which was to be cut down in due time.

On the 27th of October the redoubt had not been completed, but it was fully enclosed and capable of defence, and contained 65 square metres of cover under the banquettes.

At the same time the strength of the position was increased by the construction of three batteries, each for 6 guns, near the redoubt at Coincy, and southward of that village.

Finally, considerable additions were made to the defences of the village of Flanville, which the VII. Corps considered a post of the utmost importance. These were carried out by the 2d Field Pioneer company of the Corps during the month of October. On the south side of the village a battery was built to contain 6 guns, and a neighbouring vineyard, enclosed by high walls, was prepared for defence, the gorge-walls being levelled. Flanking works were constructed at several points round the village, and the ground in front extensively cleared.

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(1.) In the extreme advance, Colombey and La Grange-aux-Bois, which were only occupied by pickets.

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(3.) Behind the right wing lay the independent post at the village of Flanville, and a position for guns in front of Ogy. A supporting position, covering Courcelles, had been constructed behind the left wing across the road in front of Ars-Laquinexy.

The line of outposts, which was about 2000 paces in advance of the first line of defence, certainly gave sufficient security to it ; but in consequence of its advanced position it was subject to continual attack, and had to be evacuated several times during the course of the investment.

On this account the possibility and advisability of removing the line of outposts further to the rear was debated, but no decision was ever come to on the subject, as the enemy always withdrew from the chateau of Mercy-le-Haut, La Grange, and Colombey shortly after having obtained possession of them, so that it was possible each time to reoccupy them without much loss.

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*Position from Mercy-le-Haut to Marly.**Occupation.*

At the beginning of the investment this position was provisionally occupied by the 3d Cavalry Division, Mercy-le-Haut being the extreme post held by the 2d Infantry Division.

On the 27th of August the 28th Infantry Brigade was added to the above, and stationed at Pouilly.

From the 3d of September it was held by the 28th Infantry Brigade and the 2d Landwehr Pioneer Division of the XIII. Corps.

From the 6th of September by the remainder of the VII. Corps, concentrated behind the 28th Infantry Brigade.

From the 10th of September by the whole of the VII. Corps. After the 17th the right wing was stationed at Ars-Laquenexy.

From the 1st of October by the VIII. Corps, resting its right wing on the road at Ars-Laquenexy.

Works of Defence.

The only defensive works constructed at the beginning of the investment were at the chateau of Mercy-le-Haut, which the 1st Field Pioneer company fortified on the 28th and 29th of August. It was barricaded, and abattis were laid round the park. Shelter-trenches were also begun in the neighbourhood of the château, but little work could be done by day owing to the heavy fire kept up by the enemy. Finally, on the 30th of August a reserve position was constructed for the garrison of Mercy-le-Haut north-east of Frontigny.

As has already been shown, part of the 2d Division was closed in to the 1st Division on the 31st of August; but the château remained in German hands, although it had to be twice evacuated during the 1st of September.

When, at the end of August, the 28th Brigade took up a position at Pouilly, only such work as was absolutely necessary was done, there being but few technically trained troops with the Brigade.

Soon afterwards the Landwehr Division Selchow arrived, and began on the 5th of September to strengthen the position in advance of Chesny, constructing shelter-trenches on the edge of the wood and twelve positions for guns at the re-entering angles.

On the 6th of September the VII. Corps was concentrated at Pouilly, and the 14th Division at once employed the 1st and 2d Field Pioneer companies in strengthening the position. Shelter-trenches, and afterwards parapets for guns, were constructed on the heights north-west and north of the village, and the edges of the Bois de Pouilly were secured by abattis and shelter-trenches. A military road about 1000 paces long was cut through the Bois de l'Hôpital to connect the villages of Pouilly and Chesny.

Defensive positions were selected further in rear of Pouilly on

account of the probable effect of the guns of Fort Queuleu, and shelter-trenches and emplacements for 12 guns were commenced on the right of the village.

On the 11th of September Captain Junker fortified that part of the village of Marly which lies on the right bank of the Seille, and eight gun-batteries were begun beside the military road leading to Chesny. A second military road, 1000 paces long, was also cut through the Bois de l'Hôpital, which was exceedingly dense.

When the VII. Corps was extended further to the right, a brigade of the 13th Division was sent to cover the Strasburg road. It occupied the ground embracing Mercy-le-Haut, Peltre, Jury, Chesny, Frontigny, and Mécleuves, and selected the line from Chesny to Frontigny for its main position.

By the 23d of September the 3d Field Pioneer company of the VII. Corps (Captain Cleinow), assisted by two companies of Infantry, had made this position thoroughly defensible. They constructed parapets for 30 guns, covered by shelter-trenches in front.

At the same time shelter-trenches, etc., were thrown up to strengthen the existing defences of the wood to the north of Chesny. Twelve batteries for guns were also constructed across the road northward of Cheval-rouge, and six gun-batteries westward of the road from Mécleuves to Courcelles, in order to form a supporting position.

On the 27th of September Peltre was taken and temporarily held by the French; as also the château of Mercy-le-Haut, but not till the latter had been set on fire by their Artillery.

To make full provision against a possible attempt to break through towards the south, the 13th Infantry Division had begun to construct a reserve position for one or two Army Corps.

This position followed generally the ridge of the steep heights, beginning southward of Mécleuves, where there were several gun-batteries across the Strasburg road, covered in front by shelter-trenches to protect the right.

Six batteries were constructed on the heights southward of the farm of Pierrejeux, which was admirably adapted for defence, and swept the foot of the declivity. In front of Orny, on the east side of the road, there were four batteries, and on the west side two. These were protected by shelter-trenches, and were intended to prevent the enemy debouching from the Bois de l'Hôpital. The ground in front was cleared, so as to give as wide a view as possible.

136 *Operations of the German Engineers and Technical Troops.*

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The line of outposts, which was about 2000 paces in advance of the first line of defence, certainly gave sufficient security to it ; but in consequence of its advanced position it was subject to continual attack, and had to be evacuated several times during the course of the investment.

On this account the possibility and advisability of removing the line of outposts further to the rear was debated, but no decision was ever come to on the subject, as the enemy always withdrew from the château of Mercy-le-Haut, La Grange, and Colombey shortly after having obtained possession of them, so that it was possible each time to reoccupy them without much loss.

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*Position from Mercy-le-Haut to Marly.**Occupation.*

At the beginning of the investment this position was provisionally occupied by the 3d Cavalry Division, Mercy-le-Haut being the extreme post held by the 2d Infantry Division.

On the 27th of August the 28th Infantry Brigade was added to the above, and stationed at Pouilly.

Final Remarks.

The foregoing pages give a general idea of the operations of the Engineers and Pioneers attached to the army before Metz. A more accurate and detailed description would scarcely be in accordance with the object of this book, and will find a fitter place in some work expressly devoted to the history of the investment of Metz.

It has been shown that the general arrangement of the works of defence of any position was decided on the ground itself by the General Officers commanding Corps or Divisions, after a previous reconnaissance and consultation with the Headquarter Staff and with the Engineer officers concerned. The officer commanding the Engineers and Pioneers of each Corps then took over the general direction of all the works of the position to be occupied, and the officers commanding companies that of particular portions..

It may perhaps be regretted that there was in many cases a want of system and of common agreement in the plan of the works, but this was the natural consequence of a regulation giving to each commanding officer a particular duty, and throwing the responsibility of carrying it out properly wholly on himself, in order to interfere as little as possible with the independent action of individual officers by special instructions. Hence the work of each corps was in itself complete and independent, though carried on with full reliance on the co-operation of the neighbouring corps. Thus no weak places were left between two positions, but on the contrary these points were generally crowded with works, each corps strengthening especially the flanks of its own position.

The works generally consisted of a first line of weakly protected outpost positions, sufficient to give protection against small parties of the enemy, but not strong enough to be held against a largely preponderating force. Behind these there was a carefully selected and well strengthened position, capable of making a stout resistance ; besides which there was generally a supporting position to fall back on.

Numerous covered communications led down to the advanced line, and works were also thrown up to protect the pickets and their supports wherever suitable natural cover was not found. Whenever outposts were pushed forward in advance of the general

position, their stations were made defensible, so as to gain time to prepare for the defence of the main position.

The works of the main position were generally laid out with a view to the following objects :—

1. To be able to bring the heaviest possible fire of musketry on the ground in front, particularly on roads and defiles, from covered positions within effective range. To supplement this by artillery in masses firing from covered positions, separate cover being however generally given to each individual gun, in order to distract the fire of the enemy and thereby reduce its effects. To be able to command the ground in front as far as possible, for which purpose no pains were spared to clear the field of view, large areas of wood being gradually cut down, with this object.

2. To delay the approach of the enemy by obstacles of all kinds, abattis being most commonly used, for which ample materials were generally found while clearing the ground in front of the works.

3. To close the intervals between natural and artificial *points d'appui* by flanked shelter-trenches when the ground was open ; when otherwise, by impenetrable and usually defensible abattis. These lines also generally afforded a covered communication in rear of the front.

4. To construct numerous military roads and to bridge rivers and streams, so as to make it easy for the troops holding one part of the position to support those in another part.

5. To leave intervals and smaller traversed openings all along the lines, so as to enable the defenders to assume the offensive with ease. The shelter-trenches were generally of such slight profile that they could be crossed without the least difficulty by troops of all arms moving with a broad front.

It remains to be noted that an extensive system of field-telegraphs united the headquarters of all the Corps in the army, and that beacons, etc., were provided in sufficient number to spread the alarm when necessary.

The greatest watchfulness was observed day and night at the different posts of observation, so that it was easy to give the troops quartered in the various villages ample warning so as to enable them to assemble in good time for the defence of the main position.

If we endeavour to summarize the rich experience gained during the investment of Metz, the following points appear to deserve particular attention :—

1. It appears to be exceedingly difficult for an army shut up in a large entrenched camp to break through, should the investing army have had sufficient time to strengthen their positions, and have made good use of it—unless the garrison is aided by a relieving army outside.

Nevertheless, a well organized attempt to break through has every chance of success during the first period of the investment, provided the attack be as much as possible a surprise, and that sorties of different strength be made simultaneously on various points to distract the attention of the enemy.

2. The garrison of the entrenched camp can only take full advantage of the opportunities afforded by their position, when the troops, whether stationed in camps or in cantonments, are properly protected against bad weather. Hence it is of the utmost consequence to an army acting on the defensive, that ample provision for housing the troops should be provided in all entrenched camps liable to attack or to be invested.

3. A regular systematic attack on an entrenched camp, strengthened according to modern ideas, and occupied by a sufficiently large field force, would be so exceedingly difficult, and would require such an enormous amount of artillery and stores, that in most cases an investment, with its resulting starvation, would be as quick, and could be carried out at much less cost of men and materials. Care should therefore be taken in good time to provide an ample store of provisions, both for the inhabitants and for the soldiers. All fortresses in exposed positions on the frontier should possess large peace magazines, the supplies for which should be constantly renewed.

4. The investing force, on their side, should pay particular attention to the following matters :—

a. The whole circle of the investment should be divided into definite sections of defence, not too large. An Artillery and Engineer staff should be formed in each of these, and should be kept at their stations during the whole time of the investment. It should be the duty of this staff to arrange with the different officers commanding bodies of troops, so that the work may be carried on according to the general plan of the Commander-in-Chief, and be executed under the guidance and with the assistance of the techni-

cally trained troops. The commanding Engineer officers of the investing army should of course be kept fully informed of all events affecting the military position.

The stations of the troops should be changed as seldom as possible. If it is necessary to increase the number of men holding any particular part, it should not be done by a general change of stations, but by sending up more troops, or by strengthening the reserves at the threatened points.

The troops will be likely to work with a better heart and will at the defences of their positions, if they know that they will have to hold them during the whole course of the investment; and no doubt much more care will be taken to house themselves properly.

b. During the first days of the investment, the utmost energy should be used, and the greatest obtainable number of men and quantity of materials should be employed, to put the position into a fair state of defence, according to a well-considered general plan, admitting of gradual subsequent improvement.

c. It appears to be desirable to place the main position out of the effective range of the guns of the fortress. It should therefore be about $2\frac{1}{4}$ miles distant from the detached forts, when the ground admits of it.

The outposts should be sent forward from this position only so far as is absolutely necessary. They should, on principle, never allow themselves to become involved in a serious action.

The most valuable means of obtaining information is by patrols and by constant watch from well-equipped observatories placed on commanding positions, and in direct telegraphic communication with the headquarters of the General Officer concerned.

The main position should be most thoroughly prepared for a determined defence, and should possess many strong independent points, capable of resisting any sudden attack.

Besides this main position, which should, and indeed must, be defensible for a long time against superior numbers, a reserve or supporting position is necessary under some circumstances. The defences of this position need not be so strong; long lines of shelter-trenches appear particularly suitable, as there will always be time to bring up large masses of troops to defend it, and as these will have to take the offensive vigorously against the flanks of the troops making the sortie.

d. In the main position of each Army Corps, shelter should be pro-

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vided, if possible, either in houses or huts, at some important tactical point—such as the junction of several roads,—for a fully equipped reserve of at least 1 or 2 battalions, 1 squadron and 1 battery of Artillery. The construction of these huts should be put in hand at the beginning of the investment, and furthered by all possible means. The question of expense as regards these works must be set entirely in the background.

e. Endeavours should also be made at the earliest period to arrange with contractors to build bridges over the larger rivers crossing the investing lines, as the technical troops will, as a rule, then be employed at the more pressing duties of the defensive works. These bridges should be able to stand the pressure of floods and of ice-floes.

The bridge-trains of the Army Corps should not be employed for this purpose, but should be reserved for general operations in the field.

f. If possible, a line of railway should be established within the investing lines, uniting the several Corps; it will be found of the utmost value.

With regard to the defensive works, shelter-trenches laid out so as to be gradually converted into a sort of parallel, and which can be protected by obstacles, are generally preferable to enclosed redoubts.

The latter require a large amount of labour, not always to be obtained during a campaign, especially with unfavourable conditions of soil and weather; and unless they are provided with traverses and extensive bomb-proofs they afford but small protection against the accurate fire which will now be brought against them. This remark is particularly applicable to redoubts enclosing a large interior camping ground, the garrisons of which it will be difficult to protect even against the fire of the enemy's riflemen.

These redoubts should never be armed with the guns belonging to the field force, but should be considered as special covering points in the position, properly traversed epaulments for the field-guns being provided further in rear. If light 9 or 12 centimetre guns are available for the defence of the position, they should be placed in well-built batteries with casemated traverses between each pair of guns, and these batteries should be covered in front by shelter-trenches, and protected by special reserves in sheltered positions.

SUMMARY showing the POSITIONS occupied by the Army investing METZ in the middle of October 1870.

Army Corps or Division.	Distribution.	Composition of the Forces.				Advanced Position.	Fighting Position.
		Battalions.	Squadrons.	Guns.	Pioneer Companies.		
I. ARMY CORPS.	Right wing— 1st Infantry Division. In the front line, . . .	25	8	84	3	Extent 5000 Paces. The outposts joined those of the X. Corps northward of Villers l'Orme. The line then crossed the valley of Nouilly, which village lay in front of the position. It then passed in front of the villages of Servigny and Noisseville, across the road to Saarlouis, till eastward of Laувallier. This village was not occupied by the outposts.	Extent of the defensible position 5500 Paces. The villages of Faily, Poix, Servigny, Noisseville, and La Brasserie, which lay in the line, were rendered defensible. In front of, and between these, positions for guns and a large number of shelter-trenches were constructed. In addition to this, a Reserve position was taken up. Three redoubts were to have been constructed to strengthen this position, but the design was only partially carried out.
		9	1	...	...
	Distant 1 mile, . . .	3	...	24	...		
	" 3½ miles, . . .	1	2	...	...
	" 4½ miles, . . .	...	1	...	...
	Total, . . .	13	4	24	...		
	Left wing— 1st Infantry Division. In the front line, . . .	3	...	...	...
		6	...	12	...		
		3	...	12	...		
		2	...	2	...		
		2	...	2	...		
	Total, . . .	12	4	24	...		
	Corps Artillery— Distant 2½ miles, . . .	...	...	36	...
	2d Cavalry Brigade of the 1st Cavalry Division* attached to the I. Corps, if required to concentrate at St. Barbe— Distant 2½ miles, Distant 4½ "	...	...	4	...
	...	...	8	...	...
	...	12	...	...	...
	If at Vigy, Distant 2½ miles, " 3½ "	4	4	4	...		
	...	12		

* The remainder of the 1st Cavalry Division were before Thionville.

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Army Corps or Division.	Distribution.	Composition of the Forces.				Advanced Position.	Fighting Position.													
		Battalions.	Squadrons.	Guns.	Pioneer Companies.															
VII. ARMY CORPS.	<p>The Infantry Divisions changed positions every week. The Division occupying the 1st line placed in its advanced line, . . . Distant about 1 mile, Distant $2\frac{1}{4}$ miles, . . .</p> <table style="margin-left: 20px;"> <tr><td>Total, . . .</td><td>12</td><td>4</td><td>24</td><td>3</td></tr> </table> <p>The Reserve Division placed its forces—</p> <p>Distant 1 mile, . . . " $2\frac{1}{4}$ miles, . . . " $3\frac{1}{4}$ " . . . " $4\frac{1}{2}$ " . . . " $5\frac{1}{2}$ " . . .</p> <table style="margin-left: 20px;"> <tr><td>Total, . . .</td><td>13</td><td>4</td><td>24</td><td>...</td></tr> </table> <p>The Corps Artillery. Distant $5\frac{1}{2}$ miles, . . . If it were required to concentrate on the right, the following forces of the Reserve Division and Corps Artillery could be brought up to Maison-isolee :— From a distance of 1 mile and less, . . . " $2\frac{1}{4}$ miles, . . . " $3\frac{1}{4}$ " . . . " $4\frac{1}{2}$ " . . .</p> <table style="margin-left: 20px;"> <tr><td>Total, . . .</td><td>13</td><td>4</td><td>60</td><td>...</td></tr> </table>	Total, . . .	12	4	24	3	Total, . . .	13	4	24	...	Total, . . .	13	4	60	...	<p>25 8 84 3</p> <p>10 1$\frac{1}{2}$ 6 3</p> <p>2 ... 18 ...</p> <p>... 2$\frac{1}{4}$ </p> <p>12 4 24 3</p> <p>1 </p> <p>3 ... 18 ...</p> <p>7 1 6 ...</p> <p>1 3 </p> <p>1 </p> <p>36 </p> <p>2 ... 18 ...</p> <p>6 2 6 ...</p> <p>4 ... 36 ...</p> <p>1 2 </p>	<p>Extent 6000 Paces. Right wing at the mill north of La Planchette and Colombey, running thence by la Grange aux Bois to the hill west of Ars-Laquenexy.</p> <p>Extent 5000 Paces, including Montoy, Coincy, Ars-Laquenexy, and Aubigny. These villages were fortified and partially joined by shelter-trenches.</p> <p>Two large redoubts at Coincy and Aubigny increased the strength of the defensive lines.</p> <p>The fortified village of Flanville protected the right wing, and served as reserve position.</p> <p>Besides these, extensive defensible positions had been constructed across and on each side of the road to Courcelles.</p>		
Total, . . .	12	4	24	3																
Total, . . .	13	4	24	...																
Total, . . .	13	4	60	...																

Summary showing Positions of Army investing Metz. 155

Army Corps or Division.	Distribution.	Composition of the Forces.				Advanced Position.	Fighting Position.
		Battalions.	Squadrons.	Guns.	Pioneer Companies.		
VIII. ARMY CORPS.	Right wing— 15th Infantry Division. In front line, . . .	25	8	100*	3	Extent of position 10,000 Paces. Stretching from the wood westward of Ars-Laquenexy through Mercy-le-Haut to the Strasburg road. Then on to Ancien Moulin, then the northern edge of the wood d'Hôpital, the farm of St. Thiebault, the vineyard north of that place, to the copses below Marly on the right bank of the Seille.	Extent of position 10,000 Paces. The front line was defended by shelter-trenches along the edges of the woods, by batteries in front of Frontigny and at Cheval-Rouge, containing 10 heavy guns, and by the fortified villages of Chesny and Pouilly. Mercy-le-Haut and the height northward of the Bois-de-Pouilly were intended to assist in the defence of this position. Beside these, there was the peculiarly strong Reserve position, extending from the Seille by Pournoy-la-Grasse to Orny.
		Distant 1 mile, . . .	3	...	...
		" 2½ miles, . . .	3	1	...		
		" 3½ " . . .	4	2	24		
		" 4½ " . . .	2	...	...
		Total, . . .	13	4	24		
	The point of concentration at Courcelles could be reached by troops belonging to the Brigade of this Division, stationed in the second line from the following distances :—	Distant 3½ miles, . . .	2	...	...
		" 4½ " . . .	2	...	...
		" 5½ " . . .	2	...	...
			6	...	...
VIII. ARMY CORPS.	Left wing— 16th Infantry Division. In the front line, . . .	7½	2	12	...		
		Distant 1 mile, . . .	4	...	12		
		" 2½ miles, . . .	½	2	...		
		Total, . . .	12	4	24		
VIII. ARMY CORPS.	Corps Artillery. Distant 2½ miles,	6	...		
		" 3½ "	12		
		" 4½ "	6		
		" 5½ "	18		
		Total,	42		

* Including 10 heavy guns.

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Army Corps or Division.	Distribution.	Composition of the Forces.				Advanced Position.	Fighting Position.
		Battalions.	Squadrons.	Guns.	Pioneer Companies.		
3D CAVALRY DIVISION.	To concentrate on the left wing at Verney, there were—						
	Distant 1 mile, . . .	...	7	...	...
	" $2\frac{1}{2}$ miles, . . .	...	1	...	...
	" $6\frac{1}{2}$ " . . .	...	4	6	...		
	" 9 " . . .	...	1 $\frac{1}{2}$	...	...
	" 10 " . . .	...	2 $\frac{1}{2}$	...	...
	Total, . . .	...	16	6	...		
	To concentrate on the centre at Pontoy, there were—						
	Distant $3\frac{1}{2}$ miles, . . .	...	...	6	...		
	" 4 $\frac{1}{2}$ " . . .	...	9	...	...
	" $5\frac{1}{2}$ " . . .	...	4 $\frac{1}{2}$	...	...
	" $6\frac{1}{2}$ " . . .	...	2 $\frac{1}{2}$	...	...
	Total, . . .	...	16	6	...		
To concentrate on the right wing at Sorbey, there were—	Distant $2\frac{1}{2}$ miles, . . .	...	...	6	...		
	" 4 $\frac{1}{2}$ " . . .	...	4	...	...
	" $6\frac{1}{2}$ " . . .	...	8	...	...
	" 8 " . . .	...	4	...	...
	Total, . . .	...	16	6	...		

Summary showing Positions of Army investing Metz. 157

Army Corps or Division,	Distribution.	Composition of the Forces.				Advanced Position.	Fighting Position.
		Battalions,	Squadrons,	Guns,	Pioneer Companies,		
II. ARMY CORPS.	Right wing— 3d Infantry Division. Position from Marly to Augny. In the front line, . . . Distant 1 mile, . . . " 2½ miles, . . . Total, . . .	25	8	94*	3	Extending 9000 Paces. Touching the outposts of the VIII. Corps on the right bank of the Seille below Marly. The line ran from the patches of wood by la Papeterie, in front of Augny to the woods southward of Frescati, by Frescati, in front of Tournebride to the Moselle, and on the left bank of the river in front of Vaux.	Extent of the position 10,000 Paces. The right wing was protected by the village of Marly, which had been fortified. Batteries on the left bank of the Seille flanked the front of the VIII. Corps. The position was strengthened by positions for batteries, and by a strong redoubt at Augny, and by the fortified village of Augny. There was also a well-protected battery for 10 heavy guns southward of Orly, and a redoubt at the farm of Orly. On the left bank of the Moselle there were strong defensive lines in front of Vaux, and a reserve position further in rear at Ars - sur - Moselle, and southward of that village. The two banks of the Moselle were united by numerous bridges.
		11½	...	24	...		
		1	1	...	...
		3	...	...	...
		12½	4	24	...		
		6½	...	12	...		
		2	1	...	...
		2	2	...	...
		1	...	...	...
		9½	3	12	...		
On the left bank of the Moselle, from Ars to Vaux—	In front line, . . . Total, . . .	3½	1	12	...		
		12½	4	24	...		
		...	...	36	...
Corps Artillery.	In front line, Distant 2½ miles, " 3½ "	12	...		
		12	...		
		12	...		
		36	...		

* Including 10 heavy guns.

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Army Corps or Division.	Distribution.	Composition of the Forces.				Advanced Position.	Fighting Position.
		Battalions.	Squadrons.	Guns.	Pioneer Companies.		
IX. ARMY CORPS.	The 18th Infantry Division (for garrison and to defend the position) having—	23	12	100*	3	Extent of position 5000 Paces. Including Jussy, Rozérieuelles, and Chatel. Works were thrown up in front of Chatel to support the positions of the outposts.	Extent of the position 6000 Paces. Including the plateau above Jussy, Rozérieuelles, and on as far as the ravine of Chatel. Above Jussy 2 heavy guns were placed in a masked battery. The remaining 8 heavy guns were placed in a large battery built 1000 paces further westward. The villages were fortified.
	In the front line, . . .	12	1	18	2		
	Distant $2\frac{1}{2}$ miles, . . .	4	1	...	...
	" $3\frac{1}{2}$ " . . .	...	1	...	...
	Detached— Distant $16\frac{3}{4}$ miles, . . .	4	1	6	...		
		13	4	24	2		
	The 25th Infantry Division, in reserve; to concentrate at Rezonville. The troops were stationed as follows:—						
	At Rezonville, . . .	3	1	6	...		
	Distant, $2\frac{1}{2}$ miles, . . .	2	...	18	1		
	" $4\frac{1}{2}$ " . . .	4	5	12	...		
	" $6\frac{1}{2}$ " . . .	1	1	...	...
	" $11\frac{1}{2}$ " . . . (detached).	...	1	...	...
		10	8	36	1		
Corps Artillery, Concentrated at Gravelotte, . . .		...	...	30	...		

* Including 10 heavy guns.

Army Corps or Division.	Distribution.	Composition of the Forces.				Advanced Position.	Fighting Position.
		Battalions.	Squadrons.	Guns.	Pioneer Companies.		
III. ARMY CORPS.	Right wing— The 6th Infantry Division. Stationed in the advanced position from Chatel to the Bois Vignieulles, Occupying the position, Distant $2\frac{1}{2}$ miles, " $3\frac{1}{2}$ " " $4\frac{1}{2}$ " " $5\frac{1}{2}$ " " $6\frac{1}{2}$ " " 8 " " $11\frac{1}{2}$ "	25	8	94*	4	Extent of the position 8000 Paces. Including the ravine of Chatel, passing along the eastern edge of the Bois de Chatel across the plateau of Plappeville, through the Bois de Vignieulles, past Saulny and Villers les Plesnois to Point-du-Jour. The line of outposts was fortified.	Extent of position 5000 Paces. The main position to resist a large sortie was on the plateau Montigny la Grange, Amanvillers, St. Privat la Montagne. The 10 heavy guns were placed in this line.
	Left wing— The 5th Infantry Division. The 10th Infantry Brigade. Outpost position at Saulny. In the advanced position, In the main position, Distant 1 mile, " $3\frac{1}{2}$ miles,	12	4	24	...		
	The 9th Infantry Brigade. Outposts at Villers les Plesnois. This Brigade was intended, if necessary, to support the x. Corps, stationed in the valley of the Moselle. On the line of the outposts, In readiness— Distant 1 mile,	2	1	6	...		
	Total,	6	3	12	...		
	The Brigade had to march $3\frac{1}{2}$ miles to reach the main position.	1 $\frac{1}{2}$	...	...	...
	Corps Artillery— Distant $2\frac{1}{2}$ miles, " $3\frac{1}{2}$ "	5	1	12	...		
	(Was also intended to support the x. Corps)	1 $\frac{1}{2}$		
		7	1	12	...		

* Including 10 heavy guns.

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Army Corps or Division.	Distribution.	Composition of the Forces.				Advanced Position.	Fighting Position.
		Battalions.	Squadrons.	Guns.	Pioneer Companies.		
X. CORPS AND 3D RESERVE DIVISION.	x. Corps, . . . The 3d Reserve Division,	25 13	8 8	94* 36	3 1		
	<i>Remark.</i> — 3 battalions and 8 squadrons were detached to invest Thionville. After the 7th of October 2 battalions were broken up and amalgamated with other battalions.						
	Total, . . .	38	16	130	4		
	Left Bank— The 19th Infantry Division, and 3d Reserve Division. In the front line, Distant 1 mile, " 2½ miles, " 4½ " " 6½ "					Extent of the position 11,000 Paces. On the left bank 7000 Paces.	Extent of position on the left bank 7000 Paces.
		17 4 3 2 1	2 ... 8 2 ...	60 ... ... ... ...	... ... ... ... ...	Point - du - Jour, woods north of the Bois de Woippy, le Catherine, Bellevue, St. Remy, Grandes Tapes, to the Moselle opposite to the mill above Olgly.	Point - du - Jour, woods north of the Bois de Woippy, le Catherine, Bellevue, St. Remy, Grandes Tapes, to the Moselle opposite to the mill above Olgly.
	Total, . . .	25	12	60	...		
	Right Bank— The 20th Infantry Division, and 1 battalion of the 3d Reserve Division. In the front line, Distant 1 mile, " 4½ miles,					Extent on the right bank 4000 Paces. In front of Malroy, Rupigny, past Vany, and joining the I. Army Corps near Villers l'Orme.	The position in the valley was commanded by the heights on the left and right banks of the Moselle, and was protected by 3 redoubts, viz., 2 in front of Maizières and 1 eastward of Amelange. On the right bank the position extended 4000 paces.
		12 ... 1	... 4 ...	24 ... ...	... ... ...		The position was defended by the fortified villages of Malroy and Charly, the Bois de Failly, and by numerous batteries.
	Total, . . .	13	4	24	...		
	Corps Artillery— Close to the position Argancy-Olgly, Distant 1 mile,						4 bridges formed the communication with the left bank of the river, viz., 1 at Argancy, 2 at Hauconcourt, and 1 at Talange.
		... ... ...	... ... ...	18 18	...		
	Total, . . .	...	...	36	...		
	Position Malroy-Charly. Distant 1 mile, . . . .	...	...	36	...		

* Including 10 heavy guns.

Total strength of the Army investing Metz (middle of October).

186 Battalions of Infantry and Riflemen.

692 Guns (including 50 heavy guns).

96 Squadrons.

23 Pioneer Companies.

PART III.

OPERATIONS OF THE FIRST ARMY FROM THE CAPITULATION OF METZ TO THE ARMISTICE.

AFTER the capitulation of Metz, the First Army (consisting of the I., VII., and VIII. Corps, the 3d Division of the Reserve, and the 3d Cavalry Division) got orders to occupy Metz and to besiege the Ardennes fortress, as well as Verdun and Lafère. Its main work was however to protect the investment of Paris against the enemy's forces assembling in the north of France. The VII. Corps was at once directed to occupy Metz, and to besiege Thionville and Montmédy. The 13th Infantry Division remained in Metz, moving later towards the south, while the 14th undertook the sieges of the Ardennes fortresses, after accomplishing which task, it was attached to the Army of the South which was formed in January 1871.

In the early part of November the bulk of the First Army began to advance towards the north of France, and commenced operations for besieging or masking the fortresses of Verdun, Lafère, and Mezières.

CHAPTER I.

SIEGES AND BOMBARDMENTS OF THE ARDENNES FORTRESSES.

I. SIEGE OF THIONVILLE.*

General Description.

THE town of Thionville lies on the left bank of the Moselle, about $15\frac{3}{4}$ miles from Metz, and $22\frac{1}{2}$ miles from Luxemburg. The

* See Plate II.

Moselle is about 150 to 200 paces wide, and below Thionville is navigable at all times, but above the town it ceases to be navigable whenever the water falls below its average height. A solid masonry bridge, furnished with sluice-gates, communicates with the right bank; a canal which passes through the *tête-de-pont* provides for the safety of the bridge by giving passage to the surplus water during floods.

The fortress of Thionville was in exactly the same condition as in the beginning of this century, and hence deficient in nearly all the requirements of a fortress of the present day. Having therefore but small offensive power, it possessed little influence in the defence of France, but it had nevertheless a distinct local value, as it closed the upper valley of the Moselle and many lines of communication—among others the railroad to Metz, Mezières, and Luxemburg—and protected the communication between the two banks of the river.

On the left bank lies a level, fertile meadow-land about 2000 paces wide, intersected by lines of road and railway, which are only slightly raised above the general level, and afford therefore no cover from the guns of the fortress. The heights of Guentrange and other spurs of the Ardennes mountains, which rise to a height of 140 metres over the plain, almost completely encircle the town at a distance of from 3500 to 4500 paces, and afford excellent positions for the attack, which are accessible by good roads out of view of the fortress.

On the right bank gently sloping hills reach almost to the bridge-head. On the north and west the ground is unfavourable for siege operations, as the water stands within 1 metre of the surface of the ground. The main work of the fortress standing on the left bank of the river follows the course of the Moselle, and is composed of five bastioned fronts, with a strong gorge; nearly all the bastions are furnished with cavaliers. The outworks consist of counterguards separated by coupures, an inner covered way strengthened by redoubts, advanced lunettes, and an outer covered way.

In advance of the northern front 3-4, stands a large horn-work with retrenchments formed by coupures across the connecting branches. By damming the Moselle and the Fensch, a small stream which flows through a portion of the fortress, most of the ditches can be filled with water in a short time.

A large number of passive obstacles give in fact great security

to the fortifications of the left bank, and render them perfectly safe against a *coup-de-main*, but on the other hand they quite prevent the garrison from taking the offensive on account of the small space available for the deployment of troops, and because the gates are badly protected against artillery, and can be seen from considerable distances. The great number of small works, more or less mixed up together, is moreover very unfavourable to the defence.

The fortifications of the right bank consist of two principal works separated by the overflow canal, viz., a double crown-work, built by Vauban, and the large crown-work of Yutz, on Cormontaigne's system. The former may be considered to act as a redoubt or retrenchment to the latter.

Although this bridge-head had not the great passive strength possessed by the fortifications on the left bank of the Moselle, it may still be considered to have been sufficiently secure against a *coup-de-main*. In addition to the military establishments, the large interior space possessed by these works was of great use in their defence.

The fortress possessed only one bomb-proof barrack, which was far too small, but a large number of casemated traverses, of which some might be used as shot-stores and shell-rooms. Most of the powder-magazines were not covered with earth, and only partly surrounded with earth-banks, so that they were not sufficiently protected against indirect fire proceeding from an attack enveloping much of the town. Finally, there were large government baking establishments, capable of providing bread for one, or for one and a half *corps d'armée*.

The strength of the garrison may be assumed to have been 5000 men after the beginning of September, but among them perhaps only 1000 line soldiers. There were altogether 187 guns and mortars, but the number of artillerymen was not nearly sufficient.

Events prior to the Siege.

As already told, on the 15th of August, one brigade of the VIII. Corps had attempted a *coup-de-main* against the place. Later on, the fortress was masked or invested by different weak detachments of troops, which were frequently changed, and belonged for the most part, to the 3d Reserve Division. These detachments were placed under the orders of the General commanding the Army of Investment before Metz. Only small detachments of Pioneers were

attached to this little investing force, consisting at first of a detachment of the 3d Garrison Pioneer company, IX. Corps (Lieutenant Diekstahl), which was relieved on the 10th of October by a party belonging to the 1st Field Pioneer company, I. Corps, under the command of Lieutenant Kretschmer.

The Pioneer detachments had been charged with the destruction of the railways, and had then to establish a communication across the river by means of boats after the foot-bridge, which had been built at Koenigsmacker, had been destroyed by the heavy floods in the last days of October. The investment could not always be carried out thoroughly for want of force. In the beginning of September only 2 battalions and 2 cavalry regiments were employed on this duty.

On the 4th of September the officers in command of the investing force, of the above strength, received directions to take possession of the fortress, either by summoning it to surrender, or by a *coup-de-main*. Special reconnaissances were therefore made on the following day, which although confined to the main enceinte, proved that the garrison was fully on the alert.

On the 6th of September a summons to surrender was sent to the garrison, the only result of which seemed to be an increase of activity on their part, and in the course of September they made several sorties against the weak investing force. Thus, on the 17th of September a column of waggons, on the march from Sierk to Metch, were attacked near Koenigsmackern, and on the night between the 24th and 25th September the Luxemburg railroad, which had been only hastily destroyed and was merely watched by patrols of cavalry, was speedily repaired, by which means provision-trains were passed into the fortress.

On the 6th of October Major-General Biehler, commanding the Engineers of the I. Corps, was ordered to reconnoitre the fortress and to ascertain whether it could be speedily reduced, and if so, by what means.

This reconnaissance was carried out on the 7th of October. The fortress seemed to be deficient in artillery, but sufficiently strong in other respects. The General considered that, by a simple blockade, it could not be speedily reduced, as there appeared to be an abundance of supplies, but that siege operations vigorously carried out, combined with a bombardment of the closely built little town, would soon have the desired effect. For this purpose 50 to 60 heavy rifled

guns and a total of 16 battalions of Infantry were considered necessary, as well as a proper complement of Artillery and Engineers. The investing army had increased to five battalions since the beginning of October.

The north-western portion of the town appeared to offer the most favourable point for attack, as the commanding neighbouring heights favoured the earlier operations, and it appeared easy to breach the main work by distant fire. The General, however, believed that the town would surrender if heavily bombarded for several days, so that a hasty siege was only to be looked on as an ulterior alternative.

Although the possession of the fortress of Thionville would have been a great advantage to the army investing Metz, particularly on account of the Belgian and Luxemburg railways, which would then have been available for bringing up supplies, nevertheless the Commander-in-Chief considered that the heavy guns in position before Metz could not be spared for this siege, nor were the 11 battalions of Infantry available. The siege had therefore to be deferred until after the reduction of Metz.

The Siege.

Lieutenant-General von Kamecke, commanding the 14th Infantry Division, was placed in command of the besieging corps. Major Treumann was chief engineer in the beginning; later on, Colonel Riedel. The Artillery was at first commanded by Colonel von Helden-Sarnowsky, and afterwards by Major von Eynatten.

The besieging force consisted of the 14th Infantry Division (12 Infantry battalions, 4 squadrons, and 4 field batteries), 3 batteries of the Corps Artillery, the 3 Field Pioneer companies of the VII. Corps, and 5 Garrison Pioneer companies of the I., II., III. IV., and VII. Corps, 13 companies of Garrison Artillery, with 90 heavy Prussian guns, and 30 French mortars, and, finally, a detachment of the Artillery Trial Committee.

To these were added 2 battalions of the 72d Regiment, and the 2d Heavy Cavalry Regiment of the Reserve, belonging to the force which had hitherto been investing Thionville. Subsequently it became necessary to detach a force to invest Montmédy, and to observe the fortress of Longwy, after which the besieging army was constituted as follows, viz. :—

10 Infantry battalions.

- 6 Squadrons.
- 7 Field batteries.
- 7 Field and Garrison Pioneer companies.
- 13 Garrison Artillery companies.

The siege operations were delayed for several days because the 60 heavy guns which had been used in the investment of Metz had been sent on the 6th of November to Verdun. But when this fortress capitulated on the 8th of November these guns became available for the siege of Thionville. The remainder of the siege-train and the necessary ammunition were obtained between the 16th and 18th from Spandau and Saarlouis.

On the 10th of November the headquarters of the Division was transferred to Uckange, $3\frac{1}{2}$ miles south of Thionville, and on the same day a pontoon bridge was thrown across the Moselle. A second passage was established just above this bridge by means of boats obtained on the Moselle, and a third at Koenigsmacker, $3\frac{1}{2}$ miles north of the fortress by means of the bridging-train which had been taken at Forbach, and which was brought from Saarlouis on purpose. All these bridges were built by and remained in charge of the 1st Field Pioneer company of the VII. Corps. The communications between the two banks of the river were thus secured.

On the 11th and 12th of November the General commanding the Division, accompanied by his staff officers of Artillery and Engineers, reconnoitred the fortress on both banks of the river. On the ground of the observations then made, and of information otherwise obtained, the General decided that the batteries for the bombardment should be built on the heights surrounding the town, from which the town and works could be bombarded day and night without interruption. At the same time orders were issued to carry on some hurried siege operations, the First Parallel having to be opened on the night following the first day's bombardment.

These strong and energetic measures seemed to offer the best chance of compelling the fortress to surrender quickly.

The west fronts, V. and VI., were selected as the actual fronts of attack, because the ground seemed here to rise further above the water-level than elsewhere. A reconnaissance carried out by First-Lieutenant Huene showed that opposite these fronts the water stood on an average one metre below the surface of the ground. In this attack the bombarding batteries placed on the heights of

Veymerange and Quentrangle, at about 2500 paces behind the First Parallel, would be able to continue their fire up to the very time for arming the siege batteries proper. As it was desirable to reduce as much as possible the works of the attack on account of the difficulty in providing working parties, the bombarding batteries were allowed to form a part of the line of works enveloping the fronts attacked, but the natural features of the ground rendered their position very strong.

On the 13th of November the divisional headquarters were removed to Hayange, and the principal depot of the Artillery and Engineers was formed close by at Suzange. After the plan of attack had been drawn out, and the positions of the bombarding and siege batteries had been determined, the 5 available Pioneer companies and 1 battalion of Infantry were, after the 16th of November, employed every day in preparing revetting materials, and one company of Pioneers was constantly employed at the depot. It was also necessary to restore the bridge over the Veymerange, which had been destroyed, as it had to be used for the transport of the heavy guns. This duty was performed by the 2d Field Pioneer company of the VII. Corps.

The batteries were also begun on the 16th. As the positions which had been selected were mostly screened by trees from the view of the fortress, the work could in nearly all cases be carried on by day.

The batteries for the bombardment were placed as follows :—

On the right bank of the Moselle there were 8 batteries distributed at Haute Yutz, on the hills east of Illange, and in Illange wood. These were armed with 40 guns (6 long 24-prs. of 15-c.m., 6 12-prs. of 12-c.m., 4 mortars, and 24 field-guns). The long 15-c.m. guns were intended to enfilade the south-west front of the town. The other guns were to operate chiefly against the bridge-head, but occasionally also against the town.

The ranges varied from 2000 to 3900 paces, averaging perhaps about 3000 paces.

On the left bank of the Moselle there were altogether 11 batteries, armed with 45 heavy guns. Their positions were as follows :— At Château Serre 2 enfilade batteries, each of 4 long 15-c.m. guns, intended to enfilade the north-west fronts of the town at a range of 5500 paces ; 3 batteries built to the north of Thionville at Maison-rouge, armed altogether with 12 12-c.m. guns, were intended to

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enfilade the front VI.-VII., and also to bombard the town. In the space between the above batteries were placed 5 bombarding batteries, built solely for that purpose, and containing 4 short 15-c.m., and 16 12-c.m. guns. Finally a battery for 5 short 15-c.m. guns was built near Maison-rouge, also intended to act against the town.

The building of the batteries was continued till the evening of the 21st of November. In their construction the revetting materials manufactured by the Pioneers were used, and the Pioneers themselves also occasionally assisted. The batteries were armed in the night between the 21st and 22d, during a storm of rain and wind.

The arming was carried out on the whole successfully. The enemy only fired on the batteries lying west of the fortress, near the road leading to Beuvange, their first few shots causing some casualties.*

During the same night the advanced posts were pushed forward, and the villages of Gassion, Ferme, Terville, Marienthal, Guentrange, Malgrange, St. Anne, La Grange, and others, which lay immediately to the front, were occupied.

The village of Terville and the Fensch mill, which were to act as the chief points of support for the attack, were placed in a state of defence during the night of the 21st. This was carried out by the two Garrison Pioneer companies of the I. Corps, under the special direction of First-Lieutenant Naumann, and according to a plan prepared by Captain Goetze. The enemy made no attempt to disturb the working parties.

The line of the advanced posts ran from Gaisson-Ferme past the Fensch mill by Terville, Bois de Veymerange, Marienthal, Basse, Guentrange, Malgrange, St. Francois Kuntzich, Haute Yutz, and Bois de Yutz, to the Bois d'Illange. The valley of the Moselle above and below the town was held principally by Cavalry. On the morning of the 22d of November, at 7 o'clock, after the fortress had been summoned to surrender and had refused, the first shot was fired from the signal battery at Château Serre, and immediately the guns in position opened fire from all sides against the town and the fortifications.

It was arranged that each gun should fire four times in the hour during day-time, and once every hour during the night. This rule

* The lanterns used during the arming of the batteries probably drew the attention of the enemy.

was only to be departed from if a battery had to defend itself against the fire of the enemy.

The fortress began to answer the fire of the besiegers violently at about 7.30 A.M., opening from bastion No. v. against batteries Nos. 8, 9, 10, 11, 12; from bastions III. and IV. against batteries 13, 14, and 15; and from bastions VII. and I. against battery 16. The bridge-head replied to the batteries on the right bank of the river. After two hours the fire of the fortress began to slacken, and was kept up with energy only from the bridge-head. The first large fires were observed in the town at about 4 P.M., and they seemed to spread towards the evening.

As already explained, the Division had received orders to open the First Parallel during the night of the 22d.

For want of a sufficient number of troops, it was impossible to take possession of the ground immediately in front of the position chosen for the parallel, which in the ordinary course of a siege should be done some days before the opening of the parallel.

One battalion of Infantry was detailed for the duty of covering party, and was only to take up its position immediately before the arrival of the working parties. The First Parallel was opened at about 800 paces from the fortress; three battalions were told off for this duty, but furnished altogether only about 1500 men. Three Pioneer companies were to provide for the supervision of the working parties, and one to supply reserve workmen. These were the 1st and 2d Field Pioneer companies of the VII. Corps, and the 1st Garrison Pioneer company of the III. Corps, while the 1st Garrison Pioneer company of the IV. Corps took duty at the depot.

As the length of the parallel and its communications to the rear was about 4000 paces, the working party was insufficient, and especially so under the very unfavourable condition of weather and ground, but a larger working party could not be obtained, on account of the smallness of the besieging force.

The working parties who, as well as the covering parties, had to perform a march of two or three hours from their cantonments, were paraded and told off into parties by the Engineer officer on duty for the day (Captain Goetze) in the intermediate Engineer Depot, which had been established on the Beuvange road at about 3000 paces behind the centre of the First Parallel, while the commanding Engineer, Colonel Riedel, gave directions to the officers of the covering parties.

When it began to grow dark, the tracing parties, led by First-

Lieutenant von Huene, and the covering party, were pushed forward on the road between Beuvange and Thionville, followed in about three-quarters of an hour by the working parties, consisting of men of the 53d Infantry Regiment, while the bombarding batteries on each side of the road continued to fire over the head of the columns descending into the valley of the Moselle.

A barrack which lay immediately behind and within the attacked front had taken fire, and was burning so fiercely that it cast a bright light as far as 3000 paces from the works of the fortress. Had the garrison done it for the purpose of lighting up the field of attack its effect could not have been more successful.

In spite of the most unfavourable circumstances of ground and weather, the troops were able to get into their positions without being observed by the enemy. Great difficulties were also encountered in the execution of the parallel, as one portion of the working party had to be employed in damming up the ditches which crossed the line of the parallel, while another, consisting of a whole company, had to be sent to cover the left of the parallel, because the covering parties in advance, not having been properly directed, had by mistake extended too far to the right. Each man of the working party had to perform in consequence very nearly a double task.

During the first few hours the work made good progress, but toward 11 P.M. the wet began to be very troublesome. The heavy rains gradually turned every furrow in the field into a water-course, many of which ran at right angles to the line of the parallel, and had to be dammed, but after a time it became impossible to retain the water. It rose over the dams, or washed them away, and rushed into the parallel, filling it in many places, and forming a complete stream.

Towards morning it became impossible to remain in the parallel, and the guard of the trenches was therefore withdrawn. It was also impossible to employ the three Pioneer companies which had been ordered to complete the trenches. (These consisted of the available men of the 1st and 3d Field Pioneer companies of the VIII. Corps, the 3d Garrison Pioneer company of the I. Corps, and the 3d Garrison Pioneer company of the II. Corps.)

During the night between the 22d and 23d of November, the bombardment was kept up by only a few batteries, but was recommenced with full vigour on the morning of the 23d. In the afternoon, firing was stopped for several hours while some negotiations for a surrender were going on, but these came to nothing,

the Commandant of the garrison considering that the necessity for capitulating had not yet arisen.

The weather having somewhat cleared up, the work of finishing the parallel was undertaken during the night between the 23d and 24th of November by three Pioneer companies under the direction of Captain Junker, the Engineer officer for the day, but the unusual amount of water still remaining impeded the work very much.

The bombardment was continued throughout this night and the following day, the 24th of November. The fortress answered only from a few guns, principally from the works on the right bank of the Moselle.

Notwithstanding that negotiations for a surrender were again opened at mid-day, directions were issued to open a new communication to the rear from the village of Terville to the right wing of the parallel, on the night of the 24th of November, with six Infantry and three Pioneer companies, and the necessary arrangements were made by the Engineer officer for the day, Captain Goetze. Preparations for beginning the siege-batteries were also to be made during this night.

It was originally intended to begin building these batteries in the night between the 25th and 26th of November, and that they should be so far advanced on the morning of the 26th that the mortar and field-gun batteries should be ready to open fire on that morning, and all the siege-batteries on the following day. According to the plan of attack, 48 guns were to be brought into action, in addition to the 85 guns employed in the bombardment, so that 25 field and siege guns remained in reserve.

It had been further arranged that during the night between the 24th and 25th, the Engineers, protected by strong patrols, should make a close reconnaissance of the enemy's works, and, according to the information thus obtained, an attack was to have been made during the night on the advanced lunettes.

All this work, however, became unnecessary in consequence of the capitulation signed on the evening of the 24th of September, whereby the enemy surrendered 4000 prisoners, 187 guns, and a considerable quantity of provisions (about 10,000 cwt. of biscuit and meal, 19,000 cwt. of corn, etc.)

The town was entered on the 24th of November. It was almost a complete ruin, 8551 shot having been thrown into it.

The actual works of defence had suffered little, but almost all the barracks, the public and private buildings, had been destroyed.

Colonel Riedel was appointed provisional commandant of Thionville, and Captain Goetze was appointed Chief Engineer. Measures to put the place in a state of defence were immediately begun after the fires, still raging in several parts of the town, had been extinguished by the work of three companies of Pioneers.

Tabular Statement of Batteries constructed during the Siege of Thionville.

Number of the Battery.	Guns.		Distance from Object in Paces.	Object fired at and Purpose of the Battery.
	Number.	Calibre, etc.		
1	6	Field guns.	2000-3000	{ To counter-batter the bridge-head and to enfilade the eastern front of the town.
2	6	Field guns.	2800	To counter-batter the bridge-head.
3	6	Do.		
4	6	Do.		
5	6	Long 15-centimetre guns.	3300-3900	To enfilade the south-west fronts.
5 ^a	2	Heavy French mortars.	2500	Bridge-head.
6	6	6-centimetre guns.	2800-3300	Bridge-head and town.
6 ^a	2	Heavy French mortars.	2500	Bridge-head.
7	4	Long 15-centimetre guns.	5300-5700	To enfilade the north-west front of the town.
8	4	Do.	Do.	Do.
8 ^a	4	Short 15-centimetre guns.	4000-4300	To bombard the town.
9	4	12-centimetre guns.		
10	4	Do.		
11	4	Do.	3500-4000	Do. Do.
12	4	Do.		
13	4	Do.		
14	4	Do.	3400-3600	{ To bombard and enfilade the south-west fronts of the town.
15	4	Do.		
16	5	Short 15-centimetre guns.	4500	To bombard and enfilade the west fronts.
Tot. 85 guns, viz.:-				
24 Field guns.				
14 long 15-centimetre guns.				
9 short 15-centimetre guns.				
34 12-centimetre guns.				
4 French mortars.				
<hr/> Total, 85 pieces.				

II. SIEGE OF MONTMÉDY.

While the fortress of Longwy was masked by a detachment consisting of 3 battalions of Infantry, 4 squadrons of Cavalry, and 1 battery belonging to the 14th Infantry Division, the bulk of this Division, together with the greater part of the Siege Artillery and of the Pioneers, who had been engaged against Thionville, were sent off to commence the siege of Montmédy. The railway from Metz to Longuion, at which place the railway to Longwy branches off, had in the meantime been restored by a detachment of Railway Engineers, so that it was easy to forward all siege materials.

General Position and State of the Defences.

Montmédy, like Longwy, occupies a half-way position between the fortresses on the line of the Meuse and of the Moselle. The town lies on the Chiers, a stream of little depth during dry weather, but which floods rapidly during rain.

The Chiers, with its affluent the Loison and many small brooks, forms a widespread network of rivers dividing the ground round Montmédy into many sections, between which it is difficult to communicate in rainy seasons. The several hills surrounding Montmédy are sharply marked by these watercourses, and are nearly all commanded by the fortress, except where cover may be obtained behind the woods, which almost entirely surround the town. On the right bank near the town the hills rise immediately above the river. At first the slopes rise very gently at from 5° to 10° , but become steeper and steeper (up to 40°), till they reach a high table-land at a level of from 60 to 65 metres above the river, on which the main work is built.

The plateau is triangular in form, with sides of from 200 to 400 paces, and is bounded everywhere by steep declivities.

This fortress is the creation of many different epochs, and has lately been improved and made complete. The enceinte is a bastioned trace having very short flanks, some of which are casemated; the curtains are in many places protected by peculiar works like tenailles. Ravelins, counterguards, and a covered way complete this fortification, which belongs to no regular type. The escarpments and counterscarps, in many places cut out of the rock, are very

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high (up to 25 metres), and make the place almost perfectly secure against an attempt at escalade.

In the north-east front of the upper town there is a well-protected gateway, and in the eastern front a postern for foot-passengers, which by means of steps and ramps communicates with the lower town.

The fortifications of the lower town are slight, and barely secure against a *coup-de-main*. They consist principally of a loopholed wall, 6 metres high, flanked by tambours, which joins the works of the upper town. The east end of the lower town is protected by the Chiers, which is crossed by a massive bridge that had been partly demolished by the enemy.

Montmédy is of small value as a fortress, as it has but little interior space; but it is undoubtedly of great importance as commanding and closing the Ardennes railway, which passes under a spur of the hill lying north of the town through a tunnel 1000 paces long, and then crosses the valley of the Thonne on a high viaduct.

As the tunnel and the viaduct, which lay under the guns of the fortress, had been thoroughly destroyed, the fortress may be considered to have fulfilled its duty from the beginning of the war till the end of the year 1870.

2. *Events prior to the Siege.*

This fortress had already been cannonaded by the Artillery of the Guard after the battle of Sedan, as has been previously noticed. After that it had only been observed by detachments belonging to the Etappen stations at Stenay and Damvillers. The garrison had however been able, on the 11th of October, to seize the Etappen station of Stenay, together with two companies of Landwehr.

In the middle of November the fortress was invested by a mixed force consisting of 4 battalions of Infantry, 1 company of Rifles, 4 squadrons of Cavalry, 1 light battery, and a detachment of the 2d Field Pioneer company of the VII. Corps (Lieutenant Groening). This force, although vigorously opposed, were able to advance close up to the fortress. The fortress of Longwy was observed from Longuion by a flying column consisting of 3 companies of Rifles and 2 squadrons.

The investing force being too small to enclose the fortress tho-

roughly, the enemy was able, towards the end of November, to throw in an additional battalion of Infantry.

The officer commanding the investing force had given orders that a bridge which crossed the Chiers at a distance of about 2000 paces south-west of Montmédy was to be destroyed, so as to obtain additional security against the sorties of the garrison. This duty was successfully carried out by the detachment of Pioneers, protected by patrols pushed on in advance, at about midnight on the 19th November, and without being noticed by the enemy. Later in the siege it was found that by this operation a most important means of communication had been lost to the besiegers.

On the other hand the Pioneer detachment built at Chauvancy, about 4000 paces west of Montmédy, a trestle-bridge over the Chiers, and when this was carried away a few days later by a strong flood, a pile pier bridge was built at the same place.

3. *The Siege.**

The Corps told off for the siege of Montmédy consisted of—

10 Infantry battalions.

2 squadrons of Cavalry.

5 Field batteries (4 heavy and 1 light).

5 Pioneer companies, viz.—

2d and 3d Field Pioneer companies, VII. Corps.

3d Garrison Pioneer company, II. Corps.

1st Garrison Pioneer company, IV. Corps.

3d Garrison Pioneer company, VII. Corps.

11 companies of Garrison Artillery ; and

1 detachment of the Artillery Trial Committee, with 44 heavy guns (4 rifled 21-centimetre mortars, 10 long 15-centimetre guns, 10 short 15-centimetre guns, and 20 12-c.m. guns).

Lieut.-General von Kamecke, commanding the siege corps, ar-

* It had been originally intended to undertake the sieges of Montmédy and Mezières simultaneously, using for this purpose the 14th Infantry Division, von Senden's detachment, and troops of the 13th Infantry Division, and of the Corps Artillery of the VII. Corps, Accordingly 10 Infantry battalions (including a Rifle battalion), 6 squadrons of Cavalry, and 7 field batteries were told off to besiege Montmédy and observe Longwy ; also 12 Infantry battalions, 10 squadrons, and 3 batteries to besiege Mezières, and to observe Rocroi and Givet. These arrangements had however to be altered in consequence of the 13th Infantry Division having been sent to Chaumont and Chatillon.

rived on the 5th December before Montmédy, and transferred the headquarters to Louppy. The fortress of Longwy was observed, and the railway between Metz and Montmédy was guarded by the troops still available of the 14th Infantry Division. This railway was very valuable for forwarding siege materials. Communication was also kept up with the force investing Mezières, which was attached to the 14th Division, by means of small columns on the line through Sedan.

Major Treumann acted as Chief Engineer of the besieging force, and Major Schmelzer commanded the Artillery.

The first thing to be done was to establish communication between the different portions of the besieging force, which were separated by the Chiers, then heavily flooded. For this purpose a trestle-bridge was built by the 2d and 3d Field Pioneer companies, VII. Corps, at a point about 2000 paces north-west of Velosnes, close to the Belgian frontier. The 3d Garrison Pioneer company of the VII. Corps, and the 1st Garrison Pioneer company IV. Corps, built a similar bridge close to the bridge of Landzecourt, which had been blown up by the French. Each of these bridges was strong enough to carry the heaviest siege artillery.

The Engineer depot was established at Juvigny, on the Loison, $3\frac{1}{2}$ miles south of Montmédy, and the Bridge-Train taken from the French was sent there. It was intended to use this latter to bridge the Chiers when the siege operations had commenced.

From the results of a reconnaissance carried out during the first days of December, and from information obtained from existing plans of the fortress, and other sources, it was determined to attack the south front, bastions 12, 13, and 14.

The intention was to bring very heavy fire against these fronts and the whole upper town from the first artillery position, and to do so much injury as to permit the subsequent operations—especially the passage of the Chiers, which was then considerably flooded—to be carried out without suffering too great a loss.

While the Artillery were making preparations for building their batteries, the Pioneer companies were employed in establishing communications across the Chiers, which flowed behind the position of the First Parallel. This operation was rendered exceedingly difficult by it being necessary to place the bridges within from 2000 to 2500 paces of the fortress.

The restoration of the bridge at Vigneul, which had been blown

up by the investing force, was attended with great difficulty. Two spans of about 20 metres each had been destroyed, and were to be rebridged. A wooden platform was built on the ruined central pier of the bridge, and on this the trussed girders rested, with clear bearings of 20 metres. The water was between 3 and $3\frac{1}{2}$ metres deep, and the roadway of the bridge was 4 metres above the surface of the water. The work was intrusted to the 3d Garrison Pioneer company of the VII. Corps, under the command of Captain Neumann. The first preparations were begun on the 10th of December, and the bridge was completed on the evening of the 15th December.

Orders were issued for the construction of four other bridges. The 2d Field Pioneer company, VII. Corps (First-Lieutenant von Huene), prepared materials for two trestle-bridges out of rough timber, and the 2d Garrison Pioneer company of the IV. Corps (First-Lieutenant Siewert), underwent daily drill with the French Bridge Equipment, in order to be able to construct two bridges.

The extreme cold rendered it necessary to shelter the troops in the advanced posts, and for this purpose a large number of huts were required. These were prepared by the Pioneer companies, in addition to the before-mentioned works, and all were pushed forward with the greatest vigour. On the 9th of December the Artillery commenced the construction of the batteries for the bombardment.

It was determined to construct ten batteries for 42 guns, and emplacements for 20 heavy field-pieces, so that altogether 62 guns would be able to fire against the place.

The following positions were chosen for the batteries:—

Batteries Nos. 1 and 2 at Ville Cloye, about 4100 paces east of Montmédy. These were to contain together 8 12-centimetre guns.

Batteries Nos. 3 and 4 in the wood of Montmédy, about 3600 paces to the southward of the fortress (8 15-centimetre guns).

Batteries Nos. 3 and 6 at Vigneul, about 3600 paces south-west of the fortress (10 short 15-centimetre guns).

Batteries Nos. 7, 8, and 9 in the wood of Géranveaux, between 2800 and 3500 paces to the north-west of Montmédy (12 12-centimetre guns).

Battery No. 10 at Vigneul, 2900 paces south-west of Montmédy (4 rifled 21-centimetre mortars).

There were 4 batteries for heavy field-pieces, 3 of which were placed north and north-east of Montmédy near Thonne-les-Près, Petit Verneuil, and Thonnelée, at distances varying from 3000 to 4000 paces from the fortress. One section of the first battery was placed in position on the south-west of Montmédy between siege-batteries Nos. 4 and 5.

These batteries were built on the 9th, 10th, and 11th of December, with the assistance of working parties of the line, and under peculiarly difficult circumstances, owing to the extreme cold and the slippery state of the roads. On the 9th and 10th of December 9 companies of Infantry had to be employed on this duty.

All the batteries were armed during the night between the 11th and 12th of December. To protect this operation the villages of Ville Cloye, Tré le Sec, Vigneul, Thonne les Près, and Fresnoy, lying close to the fortress, were occupied by 6 companies of Infantry. Supports of about double this strength were stationed in the villages behind this front line.

As most of the batteries had been built in the woods in order to prevent the enemy seeing the work, the lines of fire had to be cleared during the night between the 11th and 12th. This was carried out by the 3d Field Pioneer company of the VII. Corps, the 3d Garrison Pioneer company of the II. Corps, and 3 Garrison Pioneer companies of the VII. Corps.

The bombardment began on the morning of the 12th of December at 7.30 A.M. The rate of firing was, during daylight, five shots per hour for guns, and three shots per hour for mortars. At night the guns were to fire one shot per hour, and the mortars one every two hours. If in self-defence, all batteries were allowed to exceed these rules. The field-guns were only to fire during the day-time.

The weather changed soon after the beginning of the bombardment, and thick fogs and rain rendered it almost impossible to take aim. The fire of the bombarding batteries was therefore slackened.

The fortress answered vigorously at first, and the firing against battery No. 5, the mortar-battery No. 10, and one of the field-batteries was particularly accurate.

On the 13th of December the besiegers' batteries continued their fire until 9 A.M. in spite of a thick fog, and were but slightly opposed. Altogether 2985 shots were fired. Propositions for a

capitulation were then commenced and concluded, and the town was entered on the morning of the 14th of December.

The four bridges already detailed were to have been built during the night between the 13th and 14th, but became now unnecessary. Their completion would have been a work of great difficulty, owing to the very flooded state of the river Chiers.

With the town, 2600 men and 65 guns, beside considerable stores of provisions, fell into the hands of the 14th Division. There were also 5 German officers and 237 men, mostly belonging to the Etappen command of Stenay, which had been captured by the French, who were now released.

When given over, the fortress was still fully capable of further defence. Although the upper town and its military establishments had suffered much during the bombardment, yet this can scarcely be considered as a sufficient excuse for a capitulation, as the civilian portion of the inhabitants had nearly all left the town, and there was ample bomb-proof accommodation for the small force required for the defence. It is true that the lower town was but weakly fortified, and quite incapable of resisting a vigorous attack, but had this part been abandoned at the proper moment the fortress would have been able to have held out for a lengthened period, and thus to have fulfilled its part in the war by closing the Ardennes railway for a longer period.

A rapid thaw, which set in after the capitulation, would have rendered regular siege operations against the upper town exceedingly difficult. Supposing it to have been possible in any case to have made a practicable breach in the escarp, of which a great part had been cut in the solid rock, it could certainly only have been accomplished at the cost of an immense outlay of ammunition. Even then the chances of success in an assault, with anything worthy of the name of a defence, would have been very doubtful, owing to the height of the counterscarps (7 to 8 metres), and of the escarp, which, even when in ruins, would still have presented a formidable obstacle.

Major Treumann was appointed as temporary Commandant of Montmédy, and First-Lieutenant von Duering took duty as Commanding Engineer. It was resolved not to arm the fortress for the present.

Tabular Statement of Batteries constructed during the Siege of Montmédy.

Number of the Battery.	Ordnance.		Distance from Object in Paces.	Object aimed at and Purpose of the Battery.
	Number.	Calibre, etc.		
1 4	{ 12-centimetre guns. Do.		4100-4500 Do.	{ Gate and communications to the lower town, guardhouse at the gate. Reverse fire against the southern fronts of attack.
2 4	Long 15-centimetre guns.			
3 4	{ Long 15-centimetre guns. Do.		3500-3700 Do.	{ Enfilade of north-west front, oblique fire against front of attack. Demolition of left flanking casemate in bastion 12, town-hall, and artillery magazine.
4 4	{ Short 15-centimetre guns. Do.			{ Counter-battering of one face of bastion 12 and bastion 14, and of the curtain between. Demolition of the masonry and production of two breaches.
5 5	{ Short 15-centimetre guns. Do.		3300-3500 Do.	{ Enfilade of southern front. Destruction of a powder-magazine.
6 5	{ 12-centimetre guns. Do.			
7 4	{ 12-centimetre guns. Do.		2800-3800 Do.	{ Counter-battering of right face of bastion No. 12 and entrance to north-west front. Destruction of flanking casemates in bastion 14; of barracks and headquarters. By battery No. 9, enfilade of front 12 to 14.
8 4	Do.			
9 4	Do.			
10 4	{ Rifled 21-centimetre mortars. Do.		2700 3800-3900	{ Shelling the opposite faces of bastions 12 and 14. Demolition of the hollow traverses in the attacked front, and simultaneous destruction of the terre-plein and parapet of the attacked front.
a. 6	Field guns.			{ Oblique reverse-fire on the south-west front. Counter-battering of the artillery of the place.
b. 6	Do.		2600-2900	{ Enfilade of attacked front 12-14. Counter-battering artillery.
c. 6	Do.		4000	{ Enfilade of east front and counter-battering artillery.
d. 2	Do.		3500-4000	{ Bombardment of the upper town and counter-battering artillery. Subsequent clearing enemy out of the Bois de Moncy.
Tot. 62 pieces, viz. :—				
8 long 15-centimetre guns.				
10 short 15-centimetre guns.				
20 12-centimetre guns.				
4 rifle 21-centimetre mortars.				
20 field guns (9-centimetre).				
Total, 62 pieces.				

III. SIEGE OF MEZIÈRES.

General Position and Description of Ground.

The fortress of Mezières is situated on the right bank of the river Meuse, on a peninsula formed by a bend of the river. It has two suburbs, called Pierre and d'Arches, the latter of which joins on to the town of Charleville, on the opposite bank. It is rich, being the seat of many industries, and contains about 18,000 inhabitants.

Mezières is one of the most important fortresses in the north-east of France, and its position, on a navigable river, at the junction of several high-roads and of four railways (to Sedan, Givet, Lille, and Rheims), gives it evidently great weight as a frontier or barrier fortress, or as a pivot for large strategical operations in the field, in defence of the line of the Meuse.

From Sedan the Meuse flows generally in a westerly direction, but about 7 miles south of Mezières it takes a bend toward the north, forming a succession of peninsulas at and below the town.

Near Mezières the width of the river is about 150 metres, its average depth from 2 to 3 metres, and it is crossed in four different places by railways. One of these bridges is at Lumes, out of sight, but the others are commanded by the works of the fortress.

Beside these there are two other masonry bridges connecting the town of Mezières and its suburbs. There were two suspension-bridges, at Dom-le-Mesnil, $6\frac{1}{2}$ miles above, and at Nouyon, the same distance below Mezières, but both had been destroyed by the enemy. The railway bridge and the suspension bridge at Lumes had been merely rendered unserviceable for traffic.

The ground round Mezières rises high above the valley of the Meuse, attaining, at a distance of about $2\frac{1}{2}$ miles, a height of from 130 to 140 metres. In places the spurs of the heights are close to the town and fortifications, particularly on the east and south, reducing very much the defensive power of the fortress, as it is entirely unprovided with detached works. On the other hand, the large woods which extend northwards of Mezières on both banks of the river render a complete investment very difficult, more especially on account of the influence exercised by the fortresses of Givet and

Rocroi (between 13 and 16 miles to the north and north-west of Mezières), combined with the proximity of the Belgian frontier, on the organization and efficiency of the numerous Franc-tireurs, whose embodiment had commenced shortly after the beginning of the war. A large force was therefore requisite to guard this great extent of ground.

The fortifications of Mezières may be enumerated as follows:— the town proper; the citadel; the northern bridge-head of Arches; the southern bridge-head of Champagne.

In the fortification of the town the old town wall was utilized. It was 9 metres high, and surrounded by a wet ditch. On the north and north-west fronts the wall is flanked by towers casemated for guns, and partially, as far as needed, protected by counterguards. On the west front stands the horn-work of St. Julien, opposite to the suburb of the same name. This work is in a good state of preservation. On the south the town is protected by a well-reveted rampart with a ravelin.

The citadel stands on the east side of the town, and is separated from it by a canal 15 metres wide which cuts through the tongue of land. It was built by Vauban, and consists of a quadrilateral bastioned work. The north front is of simple trace, and has a ravelin; the two west fronts have retired casemated flanks for guns. The south front consists of a straight line of rampart protected by a ravelin and continuous counterguard, while the two east fronts are similar to the west fronts, only that there is a counter-guard covering a sluice-gate, which gives full command of water for the ditches.

Besides several powder-magazines, the citadel contains a large bomb-proof barrack and an arsenal. The spur of high ground before the east front is crowned by an earthen lunette, behind which the railway from Sedan passes under the hill through a tunnel.

The northern bridge-head, or horn-work of Arches, is roomy and in good repair. The low ground in front is spanned toward the north by a masonry viaduct 160 metres long, which gives a passage to the water during times of flood. To the east of the bridge-head the railway runs on an embankment provided with flood openings for the same purpose. This embankment would afford cover to a besieger in many places.

The southern bridge-head, or the crown-work of Champagne, occupies a considerable amount of ground, but nearly all its lines

can be enfiladed from the southern and eastern heights, and there is a deficiency of bomb-proof cover.

When the war began the French tried to increase the effective strength of the fortress by adding several temporary works, and by improving the defences of the town of Charleville. For this purpose the churchyard and neighbouring houses on the north-west of the town were put into a state of defence; several barricades were erected in the streets, where stone and shell fougasses were also laid down, while Mont Olympe and other heights eastward of the town were strengthened by field-works. Owing to the peculiar formation of the ground in front of Charleville, which was exceedingly favourable to the defence, this part may be considered to have been safe against a *coup-de-main*.

If in the beginning of the war the French had extended the works so as to occupy the southern and eastern heights of Prix, Francheville, St. Laurent, etc., and had supplied the additional guns by withdrawing the armament from the small, useless fortresses of Givet and Rocroi, the fortress of Mezières might have been made so strong by the autumn of 1870 that it would have been impossible either to besiege it, or to invest it with the forces then at the disposal of the Germans. It would then have become of the utmost consequence to the defence of the northern portion of the empire, whereas in its unimproved, antiquated condition it was incapable of a prolonged resistance.

2. *Incidents prior to the Siege.*

Early in the campaign this fortress attempted to play a part and to prove its importance. On the 1st of September a sortie was made by the garrison on the right bank of the Meuse against the Würtemburg Division, which had crossed the river at Dom-le-Mesnil. The sortie was, however, undertaken in such small force that it was easily repulsed.

After the battle of Sedan an agreement for an armistice between the garrison of Sedan and Mezières, with forty-eight hours' notice of cessation, was signed by the Bavarian General von der Tann and the Commandant of Mezières. The French undertook to allow trains of wounded to pass into Belgium, and to suffer provisions and necessaries to reach the French prisoners at Sedan.

At first the fortress was observed only by one battalion of

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Infantry (94th Regt.), and half a squadron of Hussars, but later on detachments of the Landwehr Division of General von Selchow took part in this duty.

On the 20th September Colonel Braun, commanding the Engineers of the XIII. Corps, received orders to make a reconnaissance of the fortress, and at the same time to report in what way it would be possible to transport a number of still serviceable locomotives from Sedan to Rheims, the latter town being, as is known, at that time without railway connexion with Germany. Nothing of importance was discovered during the reconnaissance, because the ground to the south of Mezières was held by the enemy, and a reconnaissance in force was impossible—both for want of troops, and because it would have been necessary to give notice and stop the armistice. It was found impossible to forward the locomotives, because the railway-bridge over the Meuse on the Sedan line had not yet been restored, and because it would have been almost, if not quite impossible to pass the curve on the line at Mohon under the guns of the fortress.

In the beginning of October the Germans gave notice to terminate the armistice, and the investing detachment was raised to 4 battalions, 3 squadrons, and 1 battery. At the end of October an additional force of 5 battalions, 2 squadrons, and 1 battery, and the 2 Pioneer companies of the XIII. Corps, were to arrive at Mezières, as well as 4 companies of Garrison Artillery, and the siege-guns from before Soissons, as a regular siege was contemplated.

However, before these troops arrived, the Franc-tireurs, who had been organized in the meantime, began to make themselves troublesome, so that the communications with Rheims became insecure and even the fortress of Sedan was threatened.

The 1st Field Pioneer company of the IX. Corps (Captain Lilie), which together with the Light Field Bridge-train was journeying on the Soissons and Boulzicourt railway, was attacked near Launois by a large force of Franc-tireurs, who from concealed positions poured in a heavy fire on them, the train having been stopped by removing the metals. The company was, however, speedily formed up, and drove off the Franc-tireurs with great loss. An escort for supplies was at the same time attacked near the scene of this skirmish, but the Pioneer company, arriving just at the proper moment, was able to rescue it.

The above-named company, assisted by the 2d Garrison Pioneer company of the IX. Corps (Lieutenant Weiszleder), was able to restore the railway by the 2d of November, and then both companies were removed to Dom-le-Mesnil to construct a bridge over the Meuse at that place.

Before completing the investment it became necessary to undertake several expeditions against roving bodies of the enemy, so that, not counting the special arms, only 5 battalions remained before the fortress, who restricted themselves to observing it on the south and east.

After the fall of Metz, Lieutenant-General von Bentheim, commanding the 1st Infantry Division, received orders to relieve the Landwehr Division (von Selchow), and to prepare for the siege of Mezières. Major Fahlandt was given charge of the engineer operations, and Captains von der Groeben and Beck, with 3 Pioneer companies, were placed at his disposal. These were the 2d and 3d Field Pioneer companies of the I. Corps (Captains Neumann and Riemann), and the 1st Garrison Pioneer company of the I. Corps (Captain Andreea), the latter having been brought up from Strasburg, and having originally been destined to take part in the siege of Verdun. Beside these, the Pontoon train of the I. Corps was available. The Engineer staff and the Pioneer companies arrived on the 14th of November at Boulzicourt, the headquarters of the Division.

On the same day the Division commenced the investment of the fortress, and occupied the right bank of the Meuse with 3 battalions of Infantry, 1 squadron, 1 battery, and 1 Pioneer company. For the present, communication with the left bank was kept up by means of the bridge at Donchery. 1 regiment of Infantry, 1 battalion of Rifles, 1 squadron, and 2 batteries, were ordered to complete the investment of the southern side, on the ground hitherto occupied by the Landwehr Division (Senden), while the 1st Infantry brigade was directed to establish advanced posts on the west of Mezières, to secure the crossings over the Sormonne, to close the road to Rocroi, and to send out patrols in a north-easterly direction.

On the 15th of November the fortress was reconnoitred by the Staff of the Artillery and Engineers,* the front of attack was deter-

* Colonel Meissner commanded the Artillery.

mined, and the formation of an Engineer depot at Francheville begun. In order to establish a better communication with the right bank the men attached to the Pontoon train, under First-Lieutenant Bendemann, with the assistance of some men belonging to the 1st Garrison Pioneer company, laid down a pontoon-bridge at Elaire on the 16th of November.

At the same time the positions occupied as advanced posts were fortified by the Pioneer companies. Amongst several other works undertaken for this purpose, the establishment called Moulin Leblanc, to the north of Francheville, was made very strong, a breastwork for Infantry was established on the railway embankment, and the railway south of Mezières was rendered impassable at several points.

The 1st Garrison Pioneer company built a bridge over the Vence, and began to take measures for putting the gunpowder factory south of Francheville into a state of defence, and for establishing rifle-pits at Francheville.

On the 18th of November Captain Neumann was sent with a detachment of the 2d Field Pioneer company to destroy those bridges over the Sormonne which were not held by the besiegers. The bridge at Ham les Moines, which was of masonry, with arches of 12 metres span, was the first taken in hand. It was blown up by several small charges, in such a way as not to destroy the full width of the arch, but to narrow it so that only one person could pass at a time. Then the massive bridge at Haudrecy, which had a span of 9'5 metres, was completely destroyed by means of three charges, each of 15 lbs. of powder. Another detachment of the same company, under Lieut. Spohr, had in the meantime restored the bridges over the Sormonne at Tournes, Lagrange, and Warcq, and broken up the railroad at Ham les Moines and Tournes.

On the 13th of November the 3d Field Pioneer company was attached to the force investing Mezières on the right bank of the Meuse. This company examined the bridges over the Meuse at Lumes, and threw up works for their security, by establishing rifle-pits, etc. They then broke up the Belgian railway at Aiglemont in spite of the efforts of some Franc-tireurs who tried to prevent the execution of the work. Several works were undertaken at St. Laurent and at Aiglemont to strengthen the position, so that the

whole village of St. Laurent was put into a state of defence, and the work of cutting a road through the woods from this village to Aiglemont was begun.

Finally, the company set fire to a mill, with adjoining buildings, which lay on the Meuse to the east of Mahon, and about 1 mile from Mezières, as the enemy frequently occupied this mill. On the 18th of November, the company was brought in to the Engineers' depot at Boulzicourt, leaving only a detachment to carry on the works begun at St. Laurent.

On the 20th of November an order arrived for the departure of the 1st Infantry Division, with its Engineer Staff and Field Pioneer companies. They were relieved by the detachment of General von Seden.

According to the plan of attack arranged this day by the Staff of Artillery and Engineers, the choice lay between the eastern and southern sides of the fortress, as on all other points the necessary communications with the rear would have been exceedingly difficult.

On the east the formation of the ground was very favourable to the attack, promising a speedy possession of the citadel, which completely commanded the rest of the fortress. But then, on the other hand, a large force would have been required to protect the siege-works against the numerous bands of Franc-tireurs in the neighbouring woods on the north of the town; and much trouble would also, no doubt, have been experienced in the transport of the necessary material from the railway across the Meuse, on account of the small number of roads available. It would also have been necessary to have taken, in the first instance, two advanced works, and then to have carried on the attack against the citadel on a narrow spur with ground falling on each side toward the river, so that it would have been impossible either to envelop the fronts attacked, or to enfilade the fortifications of the town.

On the other hand, an attack on the south seemed to offer the following advantages:—

1. Secure positions for the siege parks.
2. Relatively shorter and easier lines of communication to the batteries for materials, etc.
3. The possibility of building the first batteries at distances varying from 1600 to 2000 paces from the fortress, under excellent cover,

and of firing directly from this position against important objects, such as gates, bridges, large powder-magazines, etc.

4. Ground favourable to a well-developed regular attack.

5. Weak works immediately opposed to the attack, as the Champagne bridge-head possessed only a dry ditch, and the escarp walls for fully 2 metres below the cordon were exposed to fire from a distance of 2000 paces.

The only difficulty in the attack on the south side was that the Meuse would have to be crossed. It was proposed to establish enfilade and breaching batteries at Prix, south-west of the fortress, to fire on the western fronts, and to breach the principal gate, which was exposed to direct fire. When this had been done the Meuse was to be crossed at Warcq, and the main attack on the south was to be strengthened by a flank attack on the west under cover of the suburb of St. Julien.

But first an endeavour was to be made to bring the fortress to terms by means of a vigorous bombardment with a great number of guns of large and medium calibre.

It remains to be mentioned that, in order to complete the investment and all the projected works of attack, 16 to 18 battalions of Infantry and a siege-train of 70 heavy guns, in addition to a proper force of the special arms, were considered necessary.

The 1st Garrison Pioneer company and the Pontoon train were left before Mezières when the 1st Infantry Division were moved.

As the besiegers, owing to insufficient force, were as yet only able to observe the town on the south side, the pontoon bridge of Elaire was dismantled.

In the meantime the Pioneer company carried on the works of defence at Francheville and Moulin Leblanc. One of the principal works was the establishment of a covered communication between Moulin Leblanc and a nail-manufactory about 800 paces in front, which was occupied by a picket. This had become necessary, because the enemy was always threatening the line at this point. As the lowness of the situation and the hard frost rendered it difficult to dig a trench, the materials found in the factories were utilized, and an excellent communication 500 paces long and 1 metre wide was constructed in two nights, the parapet being formed of mantlets in two thicknesses of iron.

On the 1st of December the company was marched to Mon-

digny, to the west of Boulzicourt, where earthworks were thrown up to protect the advanced posts; as, since the left bank of the Sormonne had been finally abandoned, the Franc-tireurs had become very active, and given much annoyance to the investing force.

Colonel Riedel, who had been appointed to command the Engineers of the investing force, arrived on the 9th of December. The 14th Infantry Division was at this time employed at the siege of Montmédy, which was expected to fall before long, and it was intended that the Division should then undertake the siege of Mezières, for which purpose also the siege and garrison artillery were on their road from before Verdun. Indeed, some guns had already arrived.

When Montmédy had fallen, the investing force was again able to extend across the river above the town, and for this purpose a pontoon bridge was built on the 18th of December at Nouvion, close beside the ruined suspension bridge. To cover the operation, 2 companies of Infantry were put across the river in boats. It was found to be necessary to bank up the approaches on account of the flood, but these and the bridge itself were so far finished by 4 P.M. that some Cavalry could be sent across.

3. *Siege Operations.*

On the 18th of December the advance of the 14th Division reached Dom-le-Mesnil, and the detachment of General von Senden, which according to the original orders was to form a part of the besieging force, received directions to advance towards Ham by forced marches. In the middle of December it was necessary to strengthen the First Army by every available man, in order to oppose the French Army of the North, then newly raised. The 14th Division had therefore arrived before Mezières just in time, but was thrown entirely on its own resources. The besieging force consisted of

12 Battalions of Infantry.

4 Squadrons.

6 Field-batteries (4 heavy, 2 light).

2 Field-Pioneer companies (the 2d and 3d of the VII. Corps).

4 Garrison Pioneer companies, viz., the 1st Garrison Pioneer

company of the I. Corps, and the 2d Garrison Pioneer companies of the II., IV., and VII. Corps.

18 Garrison Artillery companies, with 83 pieces of artillery, viz., 26 15-centimetre guns, 11 short 15-centimetre guns, 32 12-centimetre guns, 4 rifled 21-centimetre mortars, and 10 French mortars. There were altogether 78,900 rounds of ammunition for the 83 pieces.

The complete investment of Mezières was at once commenced.

2 battalions, 1 squadron, and 1 light field-battery were detailed to occupy the ground on the right bank of the Meuse. The left bank, from Nouzon to Bois de Prix, was held by 4 battalions of Infantry, 2 squadrons, 2 heavy field-batteries, and the 2d Field Pioneer company of the VII. Corps (Captain Goetze). The remaining available troops, consisting of 6 battalions of Infantry, 1 squadron, 3 batteries, and the 3d Field Pioneer company (Captain Cleinow), together with the 4 Garrison Pioneer companies which had been placed under the command of Captain Andreea, were to invest the southern portion of the fortress and carry on the siege operations.

The movements to complete the investment were carried out on the 21st of December, but the troops guarding the left bank were unable to extend their left as far as the Meuse, there being no force available for driving the enemy out of the densely wooded districts on the west and north-west of Nouzon. It was only by continual fighting that the enemy was kept from the Sormonne. The bridges over this stream at Belval and La Grange had recently been destroyed, and the 2d company had to restore the communications at these places as well as at Handrecy and Ham, which they effected by the 23d of December. This company had, however, several engagements with the enemy at La Grange and Warcq, and ultimately a portion of the château of La Grange had to be destroyed, as the inhabitants were in communication with the enemy. At the same time a portion of the company took part in a large expedition undertaken by the investing force against some bands of Franc-tireurs who had assembled at Kimogue.

On the 23d, Captain Goetze received orders to reconnoitre Nouzon with a force consisting of 1 section of Hussars, 2 sections of Infantry, and some Pioneers, the latter in waggons. The detachment advanced as far as Nouzon, and found that place and the

wood occupied by the enemy. Firing ensued, which was kept up till darkness set in.

Before returning, the Pioneer detachment broke up the railway from Mezières to Lille, near Charleville, without being noticed by the enemy.

On the 24th of December the investing detachment was concentrated on its left. Several severe skirmishes occurred during the operation, and on the following day the whole detachment was drawn over to the left bank of the Sormonne, so that it became possible to extend the line up to the Meuse.

In the meantime all was got in readiness for the siege, and the building of the first batteries could now be started. The principal attack was to be made against the southern side of the town, where the bridge-head of Champagne occupied a salient position. Operations were also to be carried on against the citadel.* The fight was to be begun with nineteen batteries, containing the following pieces :—

- 24 15-centimetre guns.
- 10 short 15-centimetre guns.
- 30 12-centimetre guns.
- 4 rifled 21-centimetre mortars.
- 30 field guns.

98 Total of guns and mortars.

The Garrison Artillery begun to build these batteries, in which they were greatly assisted by the Pioneers, as the hard frozen nature of the ground rendered the employment of skilled labour very desirable. The available Pioneers were occupied with preparations for opening a parallel. The 3d Field Pioneer company VII. Corps, and the 3 Garrison Pioneer companies, constructed covered communications to batteries Nos. 11 and 12, and to an observatory established on the right front of the latter battery. Several defensive works were also thrown up for the protection of the batteries.

On the 23d of December the 3d Garrison Pioneer company of the VII. Corps, commanded by Captain Naumann, restored the partially

* From the experience of Thionville and Montmédy, it was hoped that a heavy bombardment might induce Mezières to surrender, and the original plan of attack was therefore departed from in several instances.

destroyed railway-bridge at Lumes and the suspension bridge lower down the river. The 1st Garrison Pioneer company was also employed at the above works, and in the construction of a number of shell-proof blindages for the pickets. The 2d Field Pioneer company supplied the greater part of the men to build the two batteries at Etion, and strengthened the advanced posts in the Bois de la Haveti re and at Culbute with abattis and rifle-pits.

In spite of the very severe cold, which greatly impeded the work, the siege-batteries were finished by the evening of the 30th of December, and they were armed during the ensuing night. At the same time the lines of fire were cleared, as far as was needed, by the Pioneers.

The command of the besieging force had, in the meantime, been taken up by Major-General von Woyna, as Lieutenant-General von Kameke was recalled to the headquarters of the Commander-in-Chief, to assume the direction of the Engineer operations against Paris.

Fire was opened from all the batteries at 8.30 A.M. on the 31st of December. Between 9 and 10 A.M. the enemy answered pretty vigorously, but from that time their fire became weaker and weaker, and finally ceased altogether at 3.30 P.M.

After the first few shots, fires were seen to rise in Mezi res and in its suburbs, and soon after a large part of the town was in flames. As the enemy still held Charleville, after being summoned, it was not considered an open town, and was accordingly shelled; in consequence of this several fires broke out.

The siege-batteries fired only slowly during the night of the 31st, but recommenced in full vigour when day broke on the new year.*

The town was so much ruined that towards mid-day the Commandant commenced overtures for a capitulation, and the fortress was shortly after surrendered.†

Mezi res and Charleville were entered on the 2d January after the Pioneers had inspected the powder-magazines and looked out the mines which had been prepared in several places, so as to make all safe. The 3d Garrison Pioneer company discovered 19

* On the evening of the 31st the enemy made a sortie against batteries 4 to 8.

† The besiegers had fired altogether about 7000 rounds.

mines, viz., 2 in the railway postern, 2 common fougasses and 1 shell fougass in front of the outer barricade to the west of Charleville, and 14 common fougasses in front of the railway lunette and the horn-work of St. Julien.

On the capitulation of the fortress, about 2000 prisoners and 113 pieces of ordnance fell into the victors' hands. The garrison had originally been much stronger, so that a number of men must have escaped, probably in the direction of Givet, as at this point the investment had never been perfect.

Col. Riedel was appointed to the temporary command of Mezières, and Captain Cleisnow was named Fort Engineer, but he was afterwards relieved by First-Lieutenant Mathieu.

By the taking of Mezières the 14th Infantry Division made the Ardennes line available, opening thereby a second railway communication with Germany.

Reckoning from the date of the march of the besieging force from before Metz, it had taken just seven weeks to reduce the three fortresses of Thionville, Montmédy, and Mezières.

On the 3d of January the Division was attached to the newly formed Army of the South. It was to travel by rail to Paris and from thence to follow as reserve to the II. Corps, which had taken the direction of Montargis. In the beginning of January an impression prevailed at the headquarters of the Commander-in-Chief that General Bourbaki's army would advance on Paris by the right bank of the Loire. The real plan of operations of the enemy was only discovered some time later.

While preparations were still in hand for the embarkation of the troops at Boulzicourt, and when some few battalions were already on the march towards Mitre, near Paris, a portion of the Division was directed to make an effort to take possession of the fortress of Rocroi, lying close to the Belgian frontier.

Tabular Statement of Batteries constructed during the Siege of Mezières.

Number of the Battery.	Guns, etc.		Distance from Object in Paces.	Object aimed at and Purpose of the Battery.
	Number.	Calibre, etc.		
E I.	6	Field guns.	4200	Taking part in the general cannonade and Enfilade of south front of bridge-head, bombardment of the town and citadel.
1	4	{ 12-centimetre guns.	4500-4800	
2	4	{ Short 15-centimetre guns.	4500-4800	
3	4	{ Do.	4100	
E II.	6	Field guns.	4300	Taking part in the action generally. Bombardment of the bridge-head, and afterwards citadel and town.
E III.	6	Field guns.	Do.	
4	4	{ Rifled 21-centimetre mortars.	2900	Citadel.
5	4	{ 12-centimetre guns.	Do.	{ Ricochet and counter battery to right and left of bastion 46.
6	2	{ Long 15-centimetre guns.	2900-3400	
	2	{ Short 15-centimetre guns.		{ Enfilade of east front of citadel. Counter to left face and half of curtain 42.
7	6	{ 12-centimetre guns.	Do.	
8	6	{ Long 15-centimetre guns.	2800-3100	{ Enfilade of right and left branches of the bridge and bombardment of Mezières and Charle
9	4	{ 12-centimetre guns.	3000	
10	4	{ 12-centimetre guns.	3200	Right face of work 45, citadel, and inner town
11	6	{ Do.	2500	
12	6	{ Long 15-centimetre guns.	2500	
13	6	{ 12-centimetre guns.	4300	Counter battery to curtain 41, 42, suburb de and eastern end of Mezières.
14	6	{ Long 15-centimetre guns.	4500	
E IV.	6	Field guns.	4500	
E V.	6	Do.	Do.	{ Counter battery to right face of bastion 42, de Pierre, and interior of citadel.
Tot. 98 pieces, viz. :—				
		24 long 15-centimetre guns.		
		10 short 15-centimetre guns.		
		30 12-centimetre guns.		
		4 rifled 21-centimetre mortars.		
		30 field guns.		
Total, 98 pieces.				

IV. COUP-DE-MAIN AGAINST ROCROI.

This small fortress, lying on a plateau about 15 miles north-west of Mezières, and containing 5000 inhabitants, almost completely commands the surrounding country which consists of a plain covered by meadows and fields, divided by thin hedges. The fortress is a pentagonal bastioned work built by Vauban. Escarp walls between 10 and 11 metres high, protected by a counter-guard which surrounds the fortress, and high counterscarp revetments, give it perfect security against surprise. It is flanked throughout from the upper terreplein. There are no bomb-proof barracks, and in other respects Rocroi is, like the majority of the small French fortresses, without either detached forts or properly protected powder-magazines, etc.

At the beginning of the siege of Mezières, the 14th Division had already contemplated a *coup-de-main* against Rocroi, but by orders from headquarters it was postponed till Mezières should have fallen, it being considered that large guns would be required to bombard Rocroi, and as none were then available.

After the Division had received orders to move at once on Paris, a regular bombardment with heavy guns could no longer be undertaken for want of time, and it became necessary to trust to field artillery.

The great desideratum was to surprise the fortress, and a report was therefore carefully spread that Givet was to be besieged, while to keep up the deception contracts for the delivery of siege necessities, etc., were entered into.

At mid-day on the 4th of January 1 Infantry battalion (Major von der Mülbe), 1 squadron, 2 guns, and the 2d Field Pioneer company of the VII. Corps (Captain Goetze), were sent from Charleville towards Rocroi to reconnoitre. The above-named officers made a reconnaissance of the ground south of the fortress, returned with the detachment, and arrived towards midnight at Tournes ($3\frac{1}{2}$ miles from Charleville), having ascertained that the batteries could be moved to Rocroi without any difficulty.

This detachment, which had just marched 27 miles in bad weather, received, on its return, orders to accompany an expedition which was to start in a few hours' time—at 3 A.M. on the 5th of January—against Rocroi.

This expedition was under the command of General von Woyna, and consisted of the following troops:—

5 Battalions of Infantry.

2 Squadrons.

6 Field Batteries (Major von Eynatten), and the 2d Field Pioneer company of the VII. Corps.

The column started at 3.30 A.M. from Tournes. The cold was excessive, and the roads so slippery that nearly all the Cavalry and Artillery had to dismount.

The detachment reached Rocroi at 8.30 A.M., and enclosed the fortress on all sides without being perceived by the enemy.

In the meantime a flag of truce was sent in. The garrison appeared greatly excited by the sudden danger, but the Commandant refused to surrender. The six batteries had taken up positions on the south and south-west of the town, at ranges of from 2000 to 2500 paces. These positions had to be made out from a map, as a thick fog entirely shrouded the fortress, and were selected so as to permit of the two southern fronts being enfiladed by the two flank batteries, while the other four batteries were placed on either side of the road from Rocroi to Mezières, and could engage these fronts directly, or fire into the town. Fire was opened at 11 A.M., the fog still continuing. The ranges, which were obtained wholly from the map, could only be corrected by the sound made by the shot as it struck, but it was easy to tell whether a house was hit or not. The enemy replied rather vigorously, taking pains to enfilade the high road leading to Mezières, without, however, causing us any losses worth speaking of. An attack, made about mid-day by Franc-tireurs against the investing force, was repulsed in a short time.

Very different opinions were held as to the probability of success, as the effect of the fire could not be observed. At last the officer commanding the Division, Major-General von Senden, determined to continue firing till 6 P.M., when the troops, who were very widely dispersed, should return to their cantonments without waiting for further orders. On the fire ceasing, another flag of truce was to be sent in to demand instant surrender, and to threaten, in case of non-compliance, a continuance of the bombardment with greater force.

When First-Lieutenant von Foerster, carrying the flag of truce, which was sent in after the firing had been stopped, arrived in the fortress, he found a large number of houses on fire, and the garrison

and inhabitants in a state of great alarm. After somewhat protracted negotiations a surrender was agreed to.

The greater part of the force was already on the return march, so the rear-guard entered the town at 9 P.M. 72 pieces of ordnance, 1 standard, and about 300 prisoners, with a considerable quantity of stores (especially powder), were the result of this expedition, all obtained without loss of life, though at cost of great exertion.

The 2d Field Pioneer company, which had taken part in the reconnaissance of the day before, had been at work almost without intermission for 36 hours, either on the march or in position before the enemy, without even having had time to cook any provisions. In the extreme cold which then prevailed, and through heavy snow, they had marched over 12 German miles (54 English).

As this company was under orders to start by rail almost immediately, it could not remain at Rocroi, and the 1st Garrison Pioneer company of the VII. Corps (First-Lieutenant Siewert) was brought up from Mezières during the night of the 5th of January to take over the fortress. This company arrived at Rocroi on the forenoon of the 6th of January, and immediately proceeded to put the place in a state of defence. The fires and injury caused by the bombardment were now found to be much more considerable than was at first imagined by the victors.

During the night between the 6th and 7th of January orders were received by the 14th Division to go by train, not to Paris, as previously directed, but to Chatillon-sur-Seine.

Accordingly all the arrangements had to be altered. The battalions which had just arrived before Paris were started again on the most direct road to Chatillon-sur-Seine, where a portion of the newly-formed Army of the South was to rendezvous, and the troops still remaining at Mezières began to move in the same direction on the 8th of January. The VII. Corps was thus entirely separated from the First Army.

The siege-train which had been used at Mezières, and a portion of the Garrison Pioneers, were attached to the besieging forces in front of Péronne and Paris.

CHAPTER II.

OPERATIONS OF THE FIRST ARMY IN THE NORTH-WEST
OF FRANCE.

AFTER the capitulation of Metz the mass of the First Army commenced its march toward the north-west of France. The I. Corps formed the right wing, the VIII. Corps the left wing, the latter moving in the line of Verdun, Rheims, and Compiègne.

The detachment which for some time back had been employed in the investment and siege of Verdun was, toward the end of October, attached to the command of the First Army, and received sundry reinforcements from it.

It may be as well, therefore, to take first the sieges of Verdun and La Fère, as they had a certain relation to the subsequent operations of the First Army.

I. SIEGE OF VERDUN.

General Description.

The busy town of Verdun, containing about 12,000 inhabitants, lies on the Meuse, 11 miles west of Metz, on the line of railway in course of construction from thence to Paris, and at the junction of a large number of strategically important roads.

The Meuse flows from south to north-west between two chains of hills which have an elevation, towards the centre, of about 100 metres above the river. The heights on the left bank of the Meuse throw out narrow ridges close to the town, some of the spurs of which are included in the walls and fortifications. At a distance of 3000 paces from the works, these hills attain an elevation of 118 metres over the valley of the Meuse. The ground towards the south-west is covered with large woods, which together with numerous undulations afford excellent cover to an enemy. The hills on the right bank of the Meuse enclose the town on the south, east, and north. On the south they approach close to the fortifications, but on the east and north stand off at a greater distance. The heights on the right bank are much broken by steep ravines, mostly wooded, so that on the east and south-east they would be impracticable for the movements of large masses of troops, except on the made roads, but they afford many excellent positions for batteries, which are easy of approach.

The Meuse has an average width of from 60 to 80 metres, but may be easily crossed when the water is low. By means of dams, however, the depth of water in the river above the town can be considerably increased, and in from eight to fourteen days an inundation could be formed about 2000 paces wide, barring the approach to the southern fronts of the town, and rendering them secure against attack.

Above the town the Meuse divides into three branches; the left one is called the Canal St. Vannes, and the right one the Canal St. Aire. This branching of the river divides the fortress into four distinctly separate defensive positions:—

1. The upper town, on the left bank of the Meuse and of the Canal St. Vannes, containing the citadel.
2. The lower town, between the Canal St. Aire and the Meuse.
3. The suburb St. Victor, on the right bank of the Canal St. Aire.

4. The suburb du Pré (also called the Island), between the upper Meuse and the Canal St. Vannes.

The fortifications of these several portions of the town are extremely irregular, as much in general design as in detail.

The citadel lies at the west end of the town, and crowns the spurs of the western heights. Towards the south, the slopes of these heights fall down to the Canal St. Vannes. The fortifications consist of a heptagon bastioned on a very peculiar trace (Erard's system), with a crenelated wall along the line of the canal. The citadel has high revetments and its ditches are well flanked, some of the flanks being casemated, thus giving perfect security against a sudden attack. A large cavalier crosses the whole work, dividing it into two parts and forming a retrenchment.

The fortifications of the upper town, between the citadel and the Lower Meuse, consist of two bastioned fronts on Vauban's first system, which are almost in one straight line. The ditches can be filled with water, but only the escarpments are revetted.

The enceinte of the lower town contains two lines of defence, the outer of which, lying beyond the Meuse and the canal, consists of several bastioned fronts. The inner line is only a loopholed wall, and may be considered a retrenchment to the other.

The fortifications of the suburb St. Victor consist of a horn-work on Vauban's system, with dry revetted ditches. The chief defence, however, lies in the remarkably extensive system of countermines.

The enceinte of the suburb du Pré follows the left bank of the Canal St. Aire, and consists of a bastioned front without outworks, which flanks the right branch of the horn-work. A second bastioned front, which joins the Canal St. Vannes, completes the fortification. A complicated system, giving, however, a perfect control of water, insures great security to the works, as, in addition to the inundation mentioned above, the ditches of the fortifications of the upper and lower town can all be filled at pleasure.

The greatest source of weakness is the lack of detached forts, and the imperfect manner in which the principal sluices and escarpments are protected, several of them being entirely exposed. This is particularly the case on the western fronts of the citadel, and weighs heavily against its defensive power. The citadel is certainly the key to the possession of the town, and will therefore be invariably the first object of an attack, if strategical reasons should not forbid the formation of a siege-park on the left bank of the Meuse.

The French appear, however, to have considered the horn-work of St. Victor the most exposed point, and consequently this work had been supplied with an extended and well-built system of countermines. It was not till the year 1867 that the west fronts of the citadel were judged to be the most assailable part of the fortress, and in the report of an inspection held on the 6th of March 1867 by a committee appointed to examine the defences of the town, the front 65-66 was declared the most exposed, being protected neither by nature nor art, while the suburbs of Glorieuse and Jardin-Fontaine would afford excellent cover to a besieger. It was especially pointed out, in their report, that this front could be completely enfiladed from both banks of the Meuse, and would be in a very unfortunate position if exposed to a well-developed attack.

Nevertheless, since 1867 little or nothing had been done to improve the condition of the fortress, although its importance was fully recognised by the French.

There was sufficient bomb-proof accommodation in the fortress, but the powder-magazines and the buildings in the citadel specially intended for the service of the artillery, were mostly very badly protected, and therefore liable to be destroyed by a bombardment.

Incidents prior to the Siege.

As we have already seen, an unsuccessful attempt at a *coup-de-main* on Verdun had been made on the 24th of August by the XII. Corps when advancing on Chalons. Only one brigade was left to observe the place, which was relieved later by a mixed detachment of troops, under the command of Lieutenant-General von Bothmer.

The garrison, which had been strengthened by many thousand dispersed troops of the line, undertook several large sorties, through which the position of the weak force investing the place was often rendered exceedingly critical. For this reason the detachments of the II. Corps, occupying Etain, were on the 18th of September brought up as a reinforcement.

On the 23d of September the investing force, which had been placed under the command of General von Gayl, was raised to 7 battalions of Infantry (among them the 65th Regiment), 2 regiments of Reserve Cavalry, and 2 heavy batteries, so that they were able to enclose the place completely. No Engineer officers or Pioneer companies were attached to the force.

As it was intended to bombard the place, French guns from Sedan, Toul, and Marsal were brought up, which were to be served by three companies of Garrison Artillery.

The siege-park contained :

14 15-centimetre guns.

24 12-centimetre guns.

8 22-centimetre mortars and howitzers.

The supply of ammunition was altogether insufficient, and some of it had to be made up during the siege.

As the enemy kept continually annoying the investing force, and still held some of the outlying villages, fire was opened by the two field-batteries, on the 25th of September, against the southern front of the fortifications and the citadel, and about 200 shots were fired. The fortress answered with vigour, and the garrison made a sortie, which however was repulsed.

After an obstinate contest on the 11th and 12th of October, ground was obtained nearer to the fortress, on which siege batteries could be constructed.

The place was to be bombarded from two sides, viz., from the heights of Belleville on the right bank of the Meuse, and from the heights of Thierville on the left bank.

On the right bank the heights of Belleville offered peculiarly favourable positions for batteries, at a distance of 3000 paces from the enceinte, and about 4000 paces from the south-western end of the town.

Here 5 batteries were built, viz. :—

1 battery for 6 15-centimetre guns.

2 batteries containing 12 12-centimetre guns.

1 battery for 4 22-centimetre mortars.

1 battery for 6 heavy field-pieces.

Total, 28 pieces.

The positions chosen on the left bank form a line almost at right angles with the batteries on the right bank. Here 5 batteries were also erected at an average distance of about 2500 paces from the citadel, and 4000 paces from the east end of the town, viz. :—

1 breaching battery for 8 15-centimetre guns.

2 batteries containing 12 12-centimetre guns.

1 battery for 4 22-centimetre howitzers.

1 battery for 6 heavy field-guns.

Total, 30 pieces.

These batteries were built in the night between the 12th and 13th of October, and were forthwith armed. But they were not built with the usual finish, on account of the very unfavourable nature of the ground and the great scarcity of proper entrenching tools and revetting materials.

At 6 A.M. on the 14th of October these 58 pieces opened fire on the citadel and town. The enemy answered vigorously, and caused several losses in the siege batteries, especially in the breaching battery, and dismounted several guns.

After the fire had been maintained, day and night, for fifty-four hours, it had to be stopped for want of ammunition. What with bad ammunition and the fact that our artillery were utterly unacquainted with the nature of the French guns, we had quite failed to subdue the fire of the enemy. It must also be acknowledged that the ranges were too great, particularly for the mortars and howitzers, smooth-bore mortars being very uncertain at ranges over 2000 paces. In fact, it was proved here, as at Toul, and later at several other places, that there are endless disadvantages in using strange guns.

The bombardment was therefore altogether stopped for the time being, and a demand was sent in for 50 Prussian siege-guns from before Strasburg. At the same time, on the 23d of October, the commanding officer of the investing force applied for a reinforcement of 3 battalions of Infantry, and for some senior Engineer officers, and companies of Pioneers. As already stated, there were as yet neither Engineer officers nor Pioneers with the force.

On the 23d of October the garrison took their turn at acting on the offensive, and succeeded in spiking several siege-guns, and inflicting considerable losses on the besiegers.

Preparations for the Siege.

After the fall of Metz, 3 battalions of Infantry, the Rifle battalion, and the 2d and 3d Field Pioneer companies of the VIII. Corps, were immediately ordered to Verdun, where they arrived on the 31st of October. The Saxon Pontoon train, which had for a long time been employed at Metz, was also intended to be added to the besieging force, but it only reached Etain on the 10th of November. The Commander-in-Chief appointed Major Fahland Chief Engineer,* and Colonel Meiszner to the command of the artillery.

* Colonel Riedel, who had been appointed Chief Engineer by an Imperial Order in Council, did not arrive till after the capitulation.

General Biehler and General Schwartz, belonging to the Staff of the Commander-in-Chief, were ordered to Verdun on the 4th of November, with directions to make a reconnaissance of the fortress, to inquire into the steps already taken, and to decide whether the temporary co-operation of the I. Corps, which was marching past Verdun, would hasten the fall of the place.

The reconnaissance was carried out on the 6th and 7th of November, and resulted in an opinion that the co-operation of the I. Corps was not required, and that the place would not hold out long after the arrival of a proper siege-park, which was now actually on the road.

Major Fahland arranged the plan of attack in concert with the officer commanding the siege artillery, and all preparations were made for building the batteries, and for eventually opening a parallel. According to this plan, the principal attack was to be directed westward, against front 65-66 of the citadel. The two Pioneer companies began the arrangement of an engineer park at Fromèreville, and the erection of buildings in the artillery park which was to be established at Sivry-les-Perches. On the 4th of November the 3d Pioneer company began to build a bridge over the Meuse at Charny with rough materials. On the 7th of November Lieutenant von Huene was ordered to proceed southward of Verdun, with a detachment of the 3d Field Pioneer company, to draw the charges of the mines in the bridge of Villers, which had been prepared since the beginning of August by the French. This bridge was 115 metres long, and had an upper structure of iron on stone piers, in one of which two charges of 1½ cwt. each had been placed. The priming was found in perfect preservation, and the bridge might have been destroyed at once without any further labour.

When preparations for commencing a regular siege had been so far advanced that the batteries might have been at once begun, and a sufficient number of guns and a supply of ammunition had either actually arrived or were daily expected,* the Commandant of Verdun considered himself obliged to capitulate, fair terms having been offered.

The fortress was handed over on the 9th of November, and 4000 men became prisoners of war. There were 136 pieces of ordnance

* On the 6th of November 60 heavy guns and 7 companies of Garrison Artillery had started from Metz for Verdun.

in the fortress, and these and all war *materiel* were to be restored to France at the conclusion of a peace.

These favourable terms were granted to the French out of consideration for their long and brave defence, but more particularly because the troops and the large siege-park were urgently required for the reduction of other places.

Had Verdun held out for another week or two the capture of the Ardennes fortresses would have been much delayed, as the siege-train employed at Verdun was the only one available for the attacks on these fortresses. The saving of time thus effected proved to be of the highest importance, as it would not otherwise have been possible to have reinforced the First Army at the right moment.

From a military point of view it is impossible to explain this premature surrender of the fortress, and all the more so because the defence had been till then both skilful and energetic. Probably the fall of Metz exercised a very depressing effect both on the garrison and citizens.

When taking over the place a large number of mines were discovered by the 3d Field Pioneer company. The several bridges over the Meuse had been prepared for destruction, and a complete system of countermines had been established under the glacis of the suburb St. Victor. In the most advanced gallery, which extended about 70 metres to the front, 36 chambers had been prepared, with charges of 1½ cwt. of powder each.

Captain Eichapsel was appointed Fort Engineer, and the work of putting the place into a proper state of defence was at once begun.

II. SIEGE OF LA FÈRE.

Before the main body of the First Army commenced its advance towards the north, the 4th Brigade of Infantry was sent by rail to Soissons, which fortress had surrendered on the 16th of October to the Landwehr Division under von Selchow. The siege of La Fère was intrusted to this brigade, and it arrived before that place on the 15th of November.

General Description of the Fortress.

The small town of La Fère, containing only 4000 inhabitants, is situated on the Oise, about 18 miles north of Soissons. The railway and the high-road from Laon by Compiègne to Paris pass by the town. The heights on the east and the west completely command the town within effective range. The valley in which the fortress is situated is about one mile wide, and is intersected by the river Oise, with its tributary the Serre, and by the canal Crozat. These can be dammed so as to flood the country round the fortress, and render it perfectly secure against a *coup-de-main*.

The fortifications of the town are but slight, consisting generally of a high loopholed wall, badly flanked, but protected against direct fire by a low earthen rampart, except on the south front. A small bridge-head protects the passage of the Oise and of the canal, and commands the roads leading to Compiègne and Cambray. There are no bomb-proofs, but the town contains large artillery workshops and many workmen. After the fall of Soissons the authorities began to disarm La Fère and to transfer the artillery stores to Lille, but these measures were stopped by the workmen, who demanded that their little town should be defended to the last.

In accordance with the report of the Commandant du Génie, dated 21st of August 1870, the fortress was only armed to resist a sudden assault, as a regular siege was not considered probable on account of the town possessing such control of water. As there were no bomb-proofs of any description, the Commandant submitted a proposition in the beginning of August to construct blindages for the garrison, but this was refused on the 6th of August.

The powder-magazines were unprotected on all sides.

Two field batteries of the XIII. Corps had tried in October to make

the fortress surrendered by bombarding it for several hours, but without success. As this Corps possessed neither the men nor the materials for a proper bombardment, the siege had to be given up for the time.

The Siege.

The besieging force under the command of General Zglitzky consisted of the following troops, viz. :—

6 battalions of Infantry.

1 squadron.

1 heavy Field battery.

2 companies of Garrison Artillery.

The 2d Garrison Pioneer company of the IX. Corps.

The heavy ordnance available for the siege was

8 15-centimetre guns, }
12 12-centimetre guns, } with 385 rounds per gun.

6 heavy French 22-centimetre mortars, with 360 rounds of ammunition per mortar.

Captain Reuszner, who commanded the Pioneer company, was placed on the staff of the besieging force,* and First-Lieutenant von Roesling took his place in the company. The artillery was commanded by Colonel Bartsch.

After a reconnaissance, which was made on the 16th of November, it was determined to bombard the fortress from a position on the eastern heights in front of the village of Danizy. The railway from La Fère by Laon to Soissons passes close to this village, and would be of great service, in the first instance, to bring up the guns, and afterwards to supply ammunition. Beside this, batteries in this position would be very secure against sorties.

The first operation, however, was to strengthen the position of the besieging force, which was very much exposed to attack. The Pioneer company broke up, therefore, the railways leading to St. Quentin and to Creil, destroyed the telegraphic communications with the west and north, and demolished a bridge crossing the canal at la Frette. At the villages of Quessy and Fargniers, on the right bank of the Oise, where pickets were posted, a long line of rifle-pits was dug, and other defensive measures taken. The same was done on the heights to the west of the village of Travecy. On the

* Colonel Braun had been appointed Chief Engineer, but was unable to take up his duty on account of sickness.

left bank of the Oise, the position occupied by the advanced posts stretched from Andelain in a northerly direction as far as the Serre, following generally the line of the heights ; and this position was also entrenched by the Pioneer company, the village of Charmes and a château lying on the Laon railway being specially strengthened.

As the enemy kept continually annoying the outpost at Montfrenoy by shells, it was considered necessary to construct a splinter-proof cover, which was accordingly done on the night between the 17th and 18th of November in advance of Montfrenoy. The enemy did his best to interrupt the work, the lanterns used by the working party serving as objects to aim at, but his shots always fell short. The positions of the advanced posts on the west of the village of Danizy were made very strong in order to give security to the future siege batteries. Splinter-proof cover was provided for the outposts, and the village and the château near the railway were made defensible.

On the 24th of November the work of the batteries was so much advanced that it became necessary to begin to clear their lines of fire, and especially to cut down some poplars 30 to 40 metres high, which were very big and stood in the middle of the inundation.

Altogether 7 batteries were built, at distances of from 1500 to 2000 paces from the works of the fortress. (See appended tabular form.)

The batteries were placed behind small undulations of ground, so that but very little of them could be seen from the fortress.

In the night between the 24th and 25th of November the Pioneer company, assisted by working parties of Infantry, constructed about 600 paces of communications between the batteries and towards the rear, while First-Lieutenant von Roeszing, with the remainder of the Pioneers, undertook to remove the trees which stood in the midst of the inundation, at about 400 paces from the fortress, and almost entirely masked the fire of the batteries. The men dropped down the Oise in a boat to the place, and then the Pioneers, standing up to their middles in water, and in constant danger of being carried off into the river, began to saw the trees, which were upwards of half a metre in diameter. There were about sixty trees, and by 6 A.M. all were down. The French did not disturb the work, although parties of them in boats approached close to the place.

On the 25th of November, at 8.30 A.M., fire was opened from all the batteries against the fortifications and against the town. After an interval of half an hour the fortress answered from 24 pieces, but they were very soon silenced. Several fires were started in the town, which assumed large dimensions, and as there were neither bomb-proofs nor a sufficiency of cellars to accommodate and shelter the inhabitants, the fortress surrendered after a bombardment of thirty hours' duration, during which about 1800 shots had been fired from the besiegers' batteries. 2200 prisoners, 112 garrison guns, and a large quantity of artillery stores fell into the hands of the besiegers.

Captain Reuszner was appointed Fort Engineer. By order of the Commandant, the inundation was allowed to subside, and the railway put in working order. Preparations were also made for blowing up the fortifications, as there was no intention to arm the fortress.*

In consequence, however, of the attack made on the 3d Railway Detachment at Ham on the 10th of December, it was considered necessary to restore the armament at once. The inundations were restored and the injuries done to the gates, and defences generally, were made good. This was accomplished by the 16th of December, so that from that date the fortress may be considered to have been safe against a *coup-de-main*, such as was, indeed, actually contemplated by the French Northern Army about the middle of December.†

* An order from the General Headquarters, dated the 30th of November, directed that 'Preparations are to be made to enable the fortifications of La Fère to be destroyed, without injury to the inhabited portion of the town, immediately on receipt of an order.'

† General Faidherbe reconnoitred La Fère on the 12th and 13th of December, and considered the fortress perfectly secure against a *coup-de-main*.—*Campagne de l'Armée du Nord, 1870-71*, p. 33.

Tabular Statement of Batteries constructed during the Siege of La Fère.

Number of the Battery.	Ordnance.		Distance from Object in Paces.	Object aimed at and Purpose of the Battery.
	Number.	Calibre, etc.		
1 4	{ Long 15-centimetre guns. 15-centimetre guns. }	2500	{ Left face of ravelin 8 and bastion 7, railway station, artillery barrack, arsenal.	
2 4	{ 15-centimetre guns. }	2500	{ Left face of ravelin 8 and bastion No. 7, artillery barracks.	
3 4	Do.	2200	Salient and right flank of bastion No. 1. Positions behind bastion No. 1 and forage store.	
4 4	Do. French smooth bore	2150	Right face of bastion No. 1. Left flank and face of bastion No. 7a and railway station.	
5 6	{ 22-centimetre mortars. Long 15-centimetre guns. Field guns, 9-centimetres. }	2250	{ Bombardment of town and of the works whenever their fire became troublesome.	
6 4	{ Long 15-centimetre guns. Field guns, 9-centimetres. }	2100	{ Left face of bastion 7a and right face of bastion No. 1, the artillery school and arsenal. Subsequent production of a breach in the face of bastion 8a.	
7 6		2100	Dismounting the guns in bastions 7 and 7a.	
Tot. 32 pieces, viz. :—				
8 long 15-centimetre guns. 12 12-centimetre guns. 6 French 22-centimetre mortars. 6 Field guns.				
Total, 32 pieces.				

III. OPERATIONS OF THE FIRST ARMY PRIOR TO THE SIEGE OF ROUEN.

The mass of the First Army, which consisted of the I. and VIII. Corps and the 3d Cavalry Division, commenced its advance towards the north-west of France on the 7th of November.

On the 21st and 22d of November the VIII. Corps concentrated at Compiègne. To assist in this operation the Oise was bridged both above and below that town by the three Pioneer companies, the materials of the Light Field Bridge-train and of the Pontoon-train being used for this purpose.

The I. Corps was concentrated at Noyon after having recalled the greater part of the 1st Infantry Division, which had been detached at Mezières. The 4th Infantry Brigade was still before La Fère. The 3d Cavalry Division covered the advance of the army moving in the direction of Amiens.

On the 24th of November the headquarters and all the available troops were moved in the same direction, and came into contact with the enemy on the 27th, south of Amiens, when, after a well-contested fight, they forced them towards evening to cross over to the right bank of the river. The enemy abandoned the town of Amiens, but retained possession of the citadel.

Only one section of the 1st Pioneer company of the I. Army Corps took part in the action. It was under the command of Lieutenant Schleuther, and was told off as special covering party to the battery posted in the Bois de Haugard. The Pioneers at once constructed a number of rifle-pits, and from this shelter, in concert with one company of the 4th Regiment of Infantry, repulsed three or four attacks made by strong bodies of the enemy's riflemen, and held the position of the battery up to the end of the action. The 2d Field Pioneer company of the VIII. Corps also received orders to cover the battery on the extreme left wing, which was opposed to the fire of a much larger number of the enemy's guns.

During the night between the 27th and 28th of November, the 1st Field Pioneer company, acting on orders received from the officer commanding the 16th Infantry Division, put the village of Dury, which lay opposite the French entrenchments before Amiens, into a state of defence.

These arrangements embraced both the village and the wood to the west of it.

Before daybreak on the morning of the 28th of November, the company received orders to put a churchyard which lay about 1000 paces in front of the Lisiere into a state of defence. This was finished by daybreak. At the dawn of day patrols were sent forward towards an entrenchment about 200 paces to the front, which was discovered to have been abandoned by the enemy during the night, who had left 4 guns behind them. Advancing from this, the Pioneer company and a patrol of the 40th Regiment of Infantry discovered that, with the exception of the citadel, Amiens had been abandoned by the enemy.

The 16th Division took possession of the town on the 28th of November. On the morning of the 29th the officer commanding the division wished to try to take the citadel by storm. Captain Pagenstecher, commanding the company of Pioneers already mentioned, reconnoitred the citadel according to order, and made all preparations for an escalade, as well as for blowing down the drawbridge, and forcing the postern. A number of riflemen, especially told off, opened a heavy fire from the neighbouring houses, which was at once vigorously answered by the defenders. Under a crushing fire of all arms, Captain Pagenstecher advanced at the head of 5 miners carrying powder-bags, followed by a section of the 40th Regiment of Infantry, but he was wounded before he could reach the gate, and as there seemed to be no chance of success, the storming party was withdrawn and the firing stopped.

The staff of the Engineer and Artillery of the I. and VIII. Corps were ordered to make a reconnaissance on the evening of the 28th of November to prepare for a regular bombardment of the citadel.

The detachment told off for this service consisted of 3 battalions, 2 squadrons, and 5 batteries. Early on the morning of the 29th of November, it received orders to occupy the right bank of the Somme without passing through Amiens. However, this order could not be carried out, as all the passages over the Somme, as far as the bridge of Bray, including the railway bridge at Lamotte, all of which were in no way in charge of the detachment, were found to have been destroyed by the French, and the detachment had not been provided with pioneers and the necessary equipment for forming bridges.

The detachment made an attempt to cross a bridge within range

of the citadel, but failed, and the bombardment had to be postponed till the following day.

On the evening of the 29th of November arrangements were made to carry out the bombardment according to plans which had been prepared by the staff of the Engineers and Artillery.

The citadel is a regular pentagonal bastioned work, with escarpments up to 20 metres high, and provided with sufficient bomb-proof accommodation. The reconnaissances of the 28th and 29th of November seemed to show that it could resist effectually either a sudden assault or a bombardment; nevertheless it was resolved to try the moral effect of a well-developed fire.

The batteries of the VIII. Corps were to take up positions on the right bank of the Somme, those of the I. Corps on the left bank, and both were to concentrate their fire on the citadel. As the town is only separated from the citadel by 300 paces, it was not easy to manage this. In the streets of the town one battalion of Infantry and the 3d Field Pioneer company of the VIII. Corps were posted in readiness to storm when required.

During the night between the 29th and 30th of November the 1st Field Pioneer company of the VIII. Corps received orders to construct a bridge over the Somme at a point about 3½ miles below Amiens, before daybreak. A dark night made it exceedingly difficult to reconnoitre the river, but not only the river, but an adjoining canal running parallel to it, were bridged in one hour and a quarter, and all was ready for the batteries to cross at 7.30 A.M.

But all these preparations turned out to be unnecessary, for the garrison of the citadel, probably depressed by the death of their energetic Commandant on the previous day, capitulated, surrendering 400 prisoners and 30 guns into our hands.

It had originally been the intention of the Commander-in-Chief to follow up the enemy, who, on the 28th of November, after their defeat at Amiens, had retreated across the Somme in the direction of Lille, and the officers commanding the I. Corps sent an order at 2 P.M. on that day to Major Fahland to take with him the 1st and 3d Field Pioneer companies, with two bridge-trains,* and join the 3d Cavalry Division at Villers-Bretonneux to construct the necessary bridges across the Somme above Amiens. But, on the following night, counter orders arrived as the main body of the army was to take the direction of Rouen, while the duty of covering Amiens

* The Light Field Bridge-train of the I. Corps and the Saxon Pontoon train.

and watching the defeated enemy were undertaken by a newly-formed detachment placed under the command of General Count von der Groeben.

This detachment, consisting of 6 battalions, 8 squadrons, 3 batteries, and the 3d Field Pioneer company of the I. Corps, was specially charged with the duty of holding Amiens and the line of the Somme, and protecting the railway to La Fère. As we have already seen, this fortress had capitulated on the 25th of November. One battalion of Infantry and one Pioneer company and the required number of Garrison Artillery were left to hold the place.

The following dispositions were made to secure Amiens and the right flank of the First Army on its march:—

Captain Riemann, who had charge of all defensive works, employed a part of the 3d Field Pioneer company on the defences of the citadel, especially in carrying out a well-considered plan of defilade, by constructing earthen and hollow traverses in the three northern bastions. Expense powder-magazines, which were much required, were also built, and covered places for the sentries and guards, and the entrenchment which had been constructed by the French on the heights between Noyon and Rouen was levelled.

At the same time the Pioneer officers were charged with the destruction of the railways in different parts. Lieutenant Kretschner and a party of Pioneers were attached to a flying column which took the direction of St. Albert on the 1st of December. On the 2d and 3d of December the railway leading to Lille was rendered useless for a long time by blowing up small bridges at a point $4\frac{1}{2}$ miles north-east of St. Albert, and at Beaucourt and Treux, $3\frac{1}{2}$ miles south-west of St. Albert.

A mixed detachment was also sent on the 1st of December to reconnoitre the railway from Amiens to Abbeville, and to break up the line and the telegraph. First-Lieutenant Chambeau and a detachment of Pioneers were sent with this column. Large portions of the line were destroyed for traffic, and an iron bridge at Longpré, as well as a stone bridge at Picquigny, were partially blown up.

Finally, on the 5th of December, the railway from St. Quentin to Lille was broken up by Lieutenant Zakrzecki, and on the following day two small bridges and culverts near Essigny were blown up. Other works of destruction were intended, but were prevented by the advance of strong bodies of the enemy.

Lieutenants Zakrzecki and Chambeau, of the Engineers, covered

by Cavalry patrols, reconnoitred the fortress of Peronne on the 5th and 6th of December, as General von der Groeben intended to bombard it.

From this reconnaissance it appeared that the town was held by a garrison estimated at 5000 men, who had thrown up some strong field-works on the south side in advance of the fortress, and occupied them in force, especially the village of Biaches, so that there appeared to be no chance of success in any attempt that could be made against the position by small detachments.

As it appeared that the railway bridges near St. Albert, which had been destroyed on the 3d of December, had been restored by the enemy, a detachment was again sent to St. Albert on the 10th, under Lieutenant Chambeau, who blew up a small bridge. It would, however, have been easy to repair the damage, as the span was so small.

IV. THE TAKING OF ROUEN, AND OCCUPATION OF THE TOWN TILL THE CONCLUSION OF PEACE.

The First Army began to advance on Rouen on the 1st of December, when they surprised the enemy and forced him to abandon some hastily constructed works in front of the town, and 36 guns. The town was entered on the 5th of December, by the VIII. Corps, and as it was to become a basis for further operations, the Commander-in-Chief directed immediate measures to be taken for its defence. Accordingly, on the 8th of December, the Engineer Staff-officers of the First Army, as well as of the two Corps, in concert with the officer commanding the Artillery of the First Army, were ordered to consider the best manner in which to fortify the town of Rouen, and especially to provide for the construction of a bridge-head, so as to enable a small force to hold the town.

Reconnaissances were made on the 8th and 9th of December, with the following results.

The Seine, which is here about 160 paces wide, divides the ground under consideration into two regions, differing very much from one another in character.

The Right Bank of the Seine.

There are three hill-plateaus on the right bank of the Seine. All of them fall off towards the river in slopes of about equal steepness, which are impassable except on the roads. Two deeply-cut valleys, through which the railways run to Amiens and Havre, separate these plateaus, of which the middle one has a considerable level space between the foot of the slope and the river bank on which the town of Rouen is built. On the west and south the hills stand close over the river.

Rouen is thus surrounded by commanding heights on the west, north, east, and south-east, which must have the fullest consideration in any scheme for fortifying the town.

It is perhaps not absolutely necessary to hold the western plateau (Forêt de Roumare), on account of its great distance from the town, and besides, the close nature of the country renders it very unsuited for the construction of entrenchments. On the west, therefore, the defences were to be bounded by the valley of the Cailly brook.

The plateau extending from Mont St. Aignan to Bois Guillaume

was selected for a defensive position, but many difficulties presented themselves, owing to the absence of any commanding sites, to the deep and impassable ravines, and to the great distance from the town. But the ground round the town was so thickly built upon that it was impossible to draw the line nearer to the town.

For the above reasons it was considered necessary to build eight redoubts for the defence of the position, about 2000 paces apart, and at an average distance of 5000 paces from the centre of the town.

On the south side it appeared absolutely necessary to occupy Mont Garguan, which is close to the town, and completely commands the three bridges over the Seine. This position was much isolated, the approaches to it being very difficult, but this defect was diminished by the consideration that the nature of the ground rendered an attack from the south-east very improbable.

It was considered sufficient to build two redoubts for the protection of this plateau, which were at the same time to command the ridge called La Table-de-Pierre, thereby rendering it unnecessary to occupy the latter.

The Left Bank of the Seine.

The ground on the left bank of the Seine, which it would be necessary to hold for the defence of the town, is lower than on the right bank. From the northern boundary of the forest of Rouvray the ground has a continuous slope down to the river's bank. There is no definite boundary to the portion of the town lying on this bank of the river, and it appeared, therefore, necessary to place the line of defence on the extreme outer boundary of the suburbs, which are very irregular, and not quite built over.

It was impossible to build a bridge-head immediately in front of the bridge, on account of the mass of houses standing there. A bridge-head which would at once secure not only the passage of the river, but also the power of debouching on the left bank of the Seine, could only take the form of a number of advanced redoubts.

With this object in view it was deemed necessary to build two redoubts, at St. Quevilly and Château Montmorency, to put the château at the cross-roads west of Sotteville, the cloth-factory at the southern outlet of Sotteville, and the wood between these two points into a state of defence, and to construct a battery on the Paris railway, to the east of Sotteville.

The above works were considered the minimum that would suffice to secure the town. The redoubts were to be large enough to contain each one company, and to be of strong profile, with obstacles in the ditch, and blockhouses inside.

Considering the very unfavourable time of year, it was probable that it would be found very difficult to throw up such strong works in a short time, even if large working-parties were employed.

The entire garrison that would be required for the town was estimated as follows :—

	Battalions.	Guns.
Garrisons of 10 redoubts on the right bank, including special reserves,	11	48
Principal Reserve on the right bank,	6	...
Garrisons of the redoubts on the left bank, including special reserves,	6	24
Principal Reserve, Left Bank,	3	...
Reserve Guns, . . . . .	...	18
Total,	26 Battalions, 90 Guns.	—

In conclusion, Generals Schwartz and Biehler reported that it did not appear advisable to attempt to hold Rouen with a small force, on account of the extensive area occupied by the town and its suburbs, and of the unfavourable formation of the ground, which split up the forces of the defenders and rendered mutual support difficult with such a large and hostile population in rear. They considered that it would be better, in case of an attack, to withdraw the army from the town and lead it against the enemy freed from such crippling restrictions, and in order to be able to march the troops quickly out of the town, thought it advisable to concentrate them as much as possible.

As so large a force as would have been required to hold Rouen was certainly not available, and as it was incumbent on the army to scatter at once the forces of the enemy which were again assembling, and therefore not to be fettered to one point, it was determined to abandon all idea of fortifying the city.

The immediate establishment of railway communication between Rouen and Amiens was very important. As there were no field-railway detachments available, the duty of restoring the line was, on the 8th of December, given to Captain von der Groeben of the

Engineer staff of the First Army and a detachment of the 1st Field Pioneer company of the VIII. Corps. The work was finished on the 12th of December with the assistance of French railway employés, for evidently although larger demolitions had been intended, the rapid advance of the First Army had prevented their execution. The viaduct at Poix in particular had been mined, and the charge (about 15 cwt. of powder) was withdrawn.

After the 6th of December flying columns were sent out in all directions from Rouen. On the 8th of December a portion of the 2d Infantry Division crossed the Seine on the bridge built by the 1st and 2d Field Pioneer companies of the I. Corps, out of the materials of the Light Field-bridge Train, and of the Saxon Pontoon Column.

This bridge was at Les Andelys, about 100 paces below the position of the suspension bridge which had been destroyed by the French.

The 1st company, with the Light Field-bridge Train, arrived at Les Andelys at 10 A.M., and the 2d company with the Pontoon train $1\frac{1}{2}$ hours later. Captain Ritter directed the work, and the bridge, which was 136 metres long (31 bays), was finished by 1.45 P.M., in spite of the unfavourable weather. The troops began to cross at 4 P.M., and the bridge was dismantled again the next day.

The 1st company was then directed to guard the Seine. The company obtained a steamboat, put the pontoon section on board as crew, and examined the river in the neighbourhood of the town for a position to make a bridge. As it appeared necessary to secure Rouen against an attack from gunboats, a reconnaissance was made on the 13th of December, and a position suitable for a barrier across the river was found at Duclaire, 27 miles below the town.

To the west of this place stands a hill particularly well adapted as a position for batteries to command the Seine, which is here 280 metres wide. The depth of the river measured at low water was 10 metres, and in the middle of the stream the tide rose 2.2 metres. The only way of making a barrier was by sinking seagoing ships, with deep hulls. There were no French ships on the Seine between Duclaire and Rouen, but there was a sufficient number of English ships which could be requisitioned if necessary.

As it was impossible to build a bridge below Rouen with the bridge equipment available, the above-named Pioneer company

arranged a steam ferry at Cantelen. Some ships were requisitioned and used to make landing piers.

Some of the enemy's gunboats appeared on the Seine on the 17th and fired at the detachments of the 2d Infantry Division, occupying the ground between Duclaire and Pavilly. The Commanding Officer of the 2d Infantry Division, accompanied by Major Fahland and Captain Ritter, made a reconnaissance of the Seine on the 18th of January, and fixed the position for a barrier to close the river between Duclaire and Lafontaine, and for a battery at Lafontaine. The barrier was to be composed of sunken ships with torpedoes arranged in front of them.

On the 19th of December Captain Ritter requisitioned the first two ships, an English brig and a schooner, which were sunk on the following day by opening their hatchways, and punching holes below water.

It became more and more difficult to sink ships in position on account of the great strength of the stream (nearly 2 metres per second), which of course increased in proportion as the water-way was reduced. The difficulty was increased by the bad anchorage, the largest ship's anchors often failing to hold.

Between the 21st and 23d the Pioneers sunk 7 more ships, of which two were carried away by the stream. Two steamboats were used to place the ships in their positions, but they were scarcely powerful enough. The sinking of the tenth ship was stopped by superior orders.

The tops of the masts of all the nine ships were cut off on the 24th December; but being still fastened to the ships by the tackle, were left to float about, and it was hoped would be sufficient to bring up a ship trying to pass through a gap of the barrier. Altogether it made a very fair obstacle. Covering-batteries and shelter-trenches were thrown up on the right bank, and would have made it very difficult to reconnoitre the barrier, or to make an opening by aid of boats.

The two steamboats which had served to place the ships in position were now used to watch the river. One officer and 22 non-commissioned officers and pioneers were placed in each. First Lieutenant Bendemann had in the meantime constructed a number of torpedoes in Rouen which were to be fired by means of a galvanic battery. Some of these were placed in the river as early as the 22d of December.

A strong frost having set in, and there being much floating ice in

the river, the laying of the torpedoes, and the look-out kept by the river steamboat, had to be discontinued after the 27th of December.

It was the 6th of January before the river was again tolerably free from ice, and then there was reason to expect that the enemy would try to force the barrier. On the strength of representations to this effect made by the Commander of the I. Corps, the Minister for War determined to mobilize a force consisting of 2 officers and 55 non-commissioned officers and Pioneers belonging to the torpedo-detachments, who had been employed for a long time on the defences of the coasts, and to send them, accompanied by 27 sailors, to Rouen. This detachment, under the command of Major Vincenz, arrived at Rouen on the 8th of January, bringing with them 50 contact torpedoes.

The torpedoes could not be laid before the 29th of January, as there was too much floating ice in the Seine. However, on that and the following days, altogether 19 torpedoes were laid in one line. The conclusion of an armistice prevented the laying of a second line.

The torpedo barrier was placed opposite the left flank of the position between Le Trait and Yerville, where the XIII. Corps, which had been moved up to take part in the defence of Rouen, were to have been posted on the 26th of January. Accordingly the barrier was placed 1000 paces above Le Trait, where the Seine is 260 metres wide and up to 9 metres in depth. It was protected by a battery in a well-covered position about 1000 paces to the rear; also by riflemen, for whom there was cover behind the existing river-embankment. The torpedoes were charged with 75 pounds of powder, and fired by a very delicate concussion-fuse. They were placed at intervals of about 11·25 metres, and in a depth of half a metre below the surface at low-water, so that they would be able, even at high-water, to prevent the passage of the gunboats, which drew about 2½ metres.

By superior orders the torpedo barrier was taken up again between the 5th and 7th of February.

V. MEASURES FOR THE PROTECTION OF ROUEN ON THE
LEFT BANK OF THE RIVER.

While the 2d Infantry Division was operating as a right wing, and occupied the town of Rouen, the 1st Division began its advance along the left bank of the Seine. Flying columns reached Honfleur at the mouth of the Seine, and confirmed the report that considerable forces of the enemy were embarking for Havre.

Another flying column took a south-easterly direction from Rouen, and penetrated to Vernon. The 2d Field Pioneer company of the I. Corps, which was attached to this column, examined the two bridges over the Seine at that place and found them both completely demolished.

On the 15th of December the 1st Infantry Division advanced towards the Rille district on the left bank of the Seine, where considerable forces of the enemy had assembled.

A detachment of the 2d Field Pioneer Company of the I. Corps, under First Lieutenant Cochammer, was attached to the Division for the demolition of the railways, and succeeded in destroying the railway at several places between Caen and Paris, and between Pont Andemer and Rouen. They were particularly successful at Conches, Serquigny, and at Beaumont, where the bridge across the Depte was blown up. At Serquigny the detachment became involved in a sharp fight, and suffered some loss, but succeeded nevertheless in blowing up a small bridge. On this expedition, and often in the course of the campaign, the small quantity of powder at the disposal of the Engineers prevented many of the demolitions being as perfect as they ought to have been.

The Commander-in-Chief decided to keep on the defensive southward of Rouen, as the enemy had collected a large force on the left bank of the Seine, and as the advance of the newly formed Northern Army had caused a change in the situation.

For this reason it appeared absolutely necessary to destroy the bridges spanning the Seine at Orival and Elboeuf south of Rouen, and to establish a defensive position on the peninsula formed by the Seine.

On the other hand, the railway bridge at Oissel, in rear of this position, was not only to be maintained, but was to be rendered

suitable for the passage of troops of all arms. The bridges at Pont de l'Arches and le Manoir, above Rouen, were also to be preserved, barricaded, and held by troops. All other bridges were to be destroyed.

Captain Neumann and the 2d Field Pioneer company of the I. Corps were deputed to make the necessary reconnaissances, and to carry out these works.

On the 19th of December Captain Neumann selected the line from La Roquette by Petit Essart, Grand Essart to Grande Couronne, for the defensive position. It was about 7000 paces long, its flanks resting on the Seine, and the formation of the ground, which was generally very favourable to the defence, rendered it tenable with small numbers. This position had been fortified by the French in the middle of November, and there still existed a line of about 2000 paces in length of shelter-trench of strong profile, which, although pointing the wrong way, were easily made available. These rested on the Seine between Grand Couronne and Moulineaux, and their left reached to the Elboeuf road, which was commanded by a strong emplacement for guns. On the right flank of the position the swamps of the low ground near the Seine would have made an attack exceedingly difficult either on the trenches or on the village of Grande Couronne. Openings about 2000 paces long were cut through the wood of Rouvray, and the trees, when felled, were woven into an almost impenetrable abattis. The two villages of Essart and the buildings called Sason in front of them formed the centre of the position, the left flank of which was protected by the steep banks of the Seine, which are over 50 metres high. Here also abattis were constructed, flanked by rifle-pits, and the village of la Roquette was put into a state of defence.

These works were executed in the interval between the 21st of December and the 3d of January by large working parties of the line, superintended by a portion of the above-named company. The line parties worked with extraordinary energy, each man seeming to feel that the critical situation of the army rendered it necessary to make the best possible use of the positions occupied by it.

Great importance was attached to the destruction of the three bridges over the Seine at Elboeuf. It was impossible, on account of the frozen state of the river, to establish military bridges, and the removal of these bridges would consequently greatly increase

the difficulty of making an attack on Rouen from the south. Therefore the portion of the Pioneer company which was not employed on the entrenchments began operations for the demolition of these bridges on the 22d of December.

A commencement was made on the chain-bridge, where a span of 100 metres was destroyed in three-quarters of an hour by sawing through both chain-cables. The other span, which was the same length, was left intact. Then Captain Neumann commenced measures for the demolition of a large bridge crossed by the high-road between Elboeuf and Saint Aubin. It was constructed with five spans of 38 and 48 metres. The upper structure of this bridge consisted of lattice girders 3 metres high, and the piers were built of sandstone protected by a casing of iron 4 centimetres thick. Shafts were sunk into two of these piers, and charges of altogether 2½ cwt. of powder were lodged, which were fired simultaneously by Bickford's fuse with excellent results, destroying two bays of 48 metres each. One of these was hurled into the river and disappeared, while the other was only broken, and remained with one end still resting on the pier, while the other, held up by some pieces of iron-work, hung about 1·5 metres above the surface of the water.

There only remained the third bridge at Pont du Gravier, which carried the railway from Rouen to Caen and Paris. This viaduct was about 300 metres long with double lines of rails. The piers, which were built of blocks of granite, were 3·5 metres in thickness, and were coated with 4 to 5 centimetres thickness of iron, kept together by strong rings. It had spans of 40 and 50 metres, crossed by iron girders more than 3 metres deep.

Only two cwt. of powder was available, and a larger quantity could not be obtained immediately. All the other preparations were equally defective from want of time, tools, and men. The orders to destroy the bridge on the 23d of December were positive, and had to be obeyed, but the result was not satisfactory.

Preparations to complete the destruction were carried on day and night, but here again only 240 lbs. of powder could be obtained, which was placed in two charges. Nevertheless, according to superior orders, another attempt was made to blow up the bridge, but without any result beyond destroying the head of the piers, whereupon the girders sunk about 1 metre, maintaining, however, their position, and leaving the bridge still practicable.

In consequence of the failure of these trials a further delay of four days was allowed for preparations, and a larger quantity of powder was ordered. On the 25th of December work was resumed on two shafts which were to be sunk as deep as possible in the two piers already attacked. An attempt to break off the stone-work of the piers proved unavailing. Another attempt, made on the night between the 24th and 25th of December, to split the stones by heating them with a large fire and then pouring water over them, was equally a failure.

The work progressed but slowly on account of the great cold, the exhausted condition of the few available trained workmen, the want of proper mining tools, and the hard nature of the stone.

On the 30th of December the preparations were not nearly as complete as desirable, but the time allowed had expired, and as the men of the company were urgently required on the entrenchments, the work of lodging the charges was commenced.

The enemy tried to prevent this work by a fire of howitzer shells and rifles. As the fight appeared likely to become serious, the mines were sprung according to orders, but still without the results being altogether satisfactory, although the bridge was broken and rent in various parts, so that the roadway had sunk still more. Towards evening two smaller charges were fired in order fully to destroy the broken supports of the girders, already much shaken, but this attempt also failed. However, the solid granite blocks of the piers had been so far removed that the shafts had now only to be sunk through the concrete which filled the iron casing of the piers.

A further supply of powder having arrived from Rouen, another attempt was made on the evening of the 31st of December, when a length of 100 metres of the bridge was completely demolished. Thus, from the fact of beginning with inadequate means, over 15 cwt. of powder were finally expended in the destruction of this bridge.

By the beginning of January the defensive position taken up on the south of Rouen might be considered capable of making a good resistance. This was a matter of great importance, as the enemy was advancing in considerable numbers on both banks of the Seine. General Bentheim had therefore advanced from his entrenched position at Grande Couronne on the 31st of December, driven back the enemy, and taken the castle of Robert le Diable by storm.

On the 4th of January the enemy was driven out of his entrenched position between Maison Brûlée and La Londe, which lay opposite to our position at a distance of $3\frac{1}{4}$ miles. The Division followed the enemy, and drove him back in the direction of Honfleur. A flying column, to which a detachment of the Pioneer company, under Lieutenant Pochhammer, was attached, broke up the line of rail between Rouen and Brionne on the 10th of January by demolishing a large viaduct near St. Leger, when four cwt. of powder was used.

On the 8th and 9th of January the position which had been occupied by the 1st Division was reconnoitred by the Divisional Staff, accompanied by Captain Neumann and First-Lieutenant Bendemann. After the successful fight on the 4th of January the Division had quitted its purely defensive position at Essart, and had pushed its advanced troops as far as Bourgtheroulde and Bourgachard. These places were put into a state of defence, although not suited for a vigorous resistance. A position further to the rear was therefore taken up, stretching from Maison Brûlée by La Londe to Le Pavillon, into which it was intended the troops thrown out in advance should retire if pressed. The Pioneer company began to fortify this position on the 10th of January.

The roads leading from Bourgtherould and Bourgachard united at Maison Brûlée, which lies close to the steep bank of the Seine, and became thus a very important position. The village consisted of only a few houses which were made defensible. For the protection of the left flank of the position at Maison Brûlée, the railway dam and the highroad were closed by barricades and abatis. La Londe could not be made equally strong, as the village was less suited for defence on account of the amount of ground occupied by it. Hence the defence was mainly restricted to the southern and south-western outskirts, while the churchyard and La Bergerie, a detached building on the east of the village, were also fortified. The village was put into direct communication with Maison Brûlée by military roads cut through the wood. The left flank of the position was thrown back and rested on the steep bank of the Seine at La Pavillon. Previous to this, while the preparations were in progress for blowing up the railway bridge, the defile in the valley of the Seine had been prepared for defence by barricades, etc. etc. As this defile would form the line of retreat for

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troops stationed at La Pavillon and at La Londe, it was necessary to occupy it and to render it defensible.

These extensive works, as well as those thrown up on both banks of the Seine for the defence of Rouen, were completed on the 22d of January by the company of Pioneers, with the assistance of working parties of the line.

Further improvements were rendered unnecessary by the armistice which followed shortly afterwards.

VI. EXPEDITIONS ON THE RIGHT BANK OF THE SEINE.

During December, while, as we have seen, the flying columns of the 1st Division were penetrating to Honfleur, another expedition was despatched on the right bank of the Seine to reconnoitre Havre, and, if circumstances should be found favourable, to attempt a *coup-de-main* against it.

The main body of the VIII. Corps advanced on the right bank of the Seine, and occupied Dieppe on the 14th of December, destroying some war *materiel* that was found there.

The telegraphic communication was destroyed along the whole coast, and over a large tract of country between Dieppe, Rouen, Havre, and St. Valery by a flying column to which Captain Beck of the Engineers was attached. The lines of railway were also broken up in several places.

The 16th Division of Infantry, which had been sent in the direction of Havre, soon discovered that that place was well armed, and held by a considerable force, so that it could not be taken by a *coup-de-main*. It would also have been necessary to have made a preliminary attack on the entrenched positions at Mont-Villiers and Harfleur, and as in the meantime the situation of the detachments left behind in Amiens had become very critical on account of the advance of the French Army of the North, this Division and the other parts of the VIII. Corps were, about the middle of December, ordered to move on Amiens by forced marches.

At this time the duty of protecting Rouen on the right bank of the Seine was transferred to the I. Corps, which sent a succession of strong flying columns in the direction of Havre, Dieppe, etc., so as to keep the enemy in check.

A defensive position was constructed on the north-west of Rouen, at Varentin, on the line of rail between Havre and Rouen. The work was commenced on the 5th of January by a detachment of the 1st Field Pioneer company under Lieutenant Thielsch. One of the first works was to establish a number of rifle-pits on the heights southward of Varentin, which were intended to prevent the enemy debouching after passing through Varentin and through the defile eastward of the town. The main line of defence was further to the rear, in the direction of Les Champeaux and Malgaize, where

Large works were thrown up by civil workmen obtained on requisition.

A stronger reconnaissance was made on the 13th of January in the direction of Havre, and the railway between Havre and Fécamp was examined by the Pioneer detachment to beyond the point where the line to Rouen branches off. A viaduct of more than 1100 paces in length was selected for demolition, and the work of sinking shafts for mines was begun on the evening of the 14th of January, when it was interrupted in consequence of an attack by the enemy. It could only be resumed on the following morning under the protection of a company of Infantry.

The viaduct was completely destroyed, one span falling entirely and the two neighbouring spans being very much shaken. At another place a bridge across a road was destroyed by throwing over the iron girders which supported it.

During its advance on Havre, the flying column became engaged in a sharp fight near St. Romain, in which the Pioneer detachment took part. As the enemy brought up large forces the flying column retired, on the 18th of January, through Bolbec back to Varentin.

Towards the end of January, the XIII. Corps, which had hitherto been attached to the Second Army, received orders to relieve the portion of the I. Corps which had been stationed at Rouen. From this time forth there was therefore a sufficient force at Rouen for its full protection on both banks of the Seine. The XIII. Corps arrived in Rouen on the 25th of January. The armistice, which ensued within a few days, put an end to all hostilities on the right bank of the Seine.

VII. OPERATIONS OF THE FIRST ARMY ON THE SOMME FROM THE BEGINNING OF DECEMBER TILL THE END OF THE CAMPAIGN.

1. *Battle of Hallue.*

The French army, which was beaten at Amiens on the 27th of December, had retired to reorganize under the protection of the fortresses in the north of France. The fortress of Peronne, lying on the Somme, 31 miles from Amiens, and at the same distance from La Fère, may be regarded as constituting the advanced post of the French position, under cover of which it was possible to resume the offensive at any time.

General Faidherbe, who has been appointed to command the French army, began to move forward on the 8th of December, mainly with the view of preventing the German forces from advancing any further towards the important seaport of Havre.

On the 9th of December a section of the 3d Field Pioneer company, which was engaged at Ham in the restoration of the railway between La Fère and Amiens, was surprised: the enemy attacking the place from different directions, with a force consisting of 1 battalion and 6 guns. The weak covering party (about 50 men), did not consider that they could hold the castle, and capitulated during the night between the 9th and 10th of December, the enemy having opened fire on the castle.

On the 12th and 13th of December, General Faidherbe made a reconnaissance of the fortress of La Fère. As it appeared to him secure against a *coup-de-main*, he resolved on the 14th to advance against Amiens after the German forces had retired and evacuated that place.

The enemy also gave up his apparent intention of attacking the citadel of Amiens, which had just been placed in a state of defence, and retired to the right bank of the Somme, as large reinforcements were advancing from all directions to protect the threatened line between La Fère and Amiens.

The Somme passes the towns and fortresses of St. Quentin, Ham, Peronne, Amiens, and Abbeville, and forms an admirable line of defence against an attack from the south.

Between Amiens and St. Quentin the river is only between 10

and 15 metres wide, but the fall is pretty considerable. To provide for the navigation of the river a peculiar ship-canal has been constructed at different places, wherever the course is obstructed by mills or factories. The bed of the river is in many places very muddy, and its valley marshy and very difficult to pass.

The enemy had destroyed nearly all the communications across the river.

About $5\frac{1}{2}$ miles eastward of Amiens, the Hallue, a small stream running through a rather deeply-cut bed, falls into the Somme. The main body of the French had taken up a position on the left bank of this stream, which covered their front, while their left flank was protected by the Somme. On the right of the position were some heights which commanded the whole of the ground in front, and were crowned with strong rifle-pits and sunken batteries. Daours, Bussy, Querrieux, and other villages lying in the valley, were only to be held in small force.

The headquarters of the First Army arrived on the 20th of December in Amiens. On the following day the Engineer Staff inspected the citadel, which, under the circumstances, had become a point of the utmost importance, and great pains was taken to improve the defences and armament. General Biehler ordered many additions to the armament, besides traverses to protect the flank guns against musketry ; also the construction of bomb-proofs for the guards of the ramparts, and stores to hold three months' provisions for 1200 men.

The VIII. Corps, and 6 battalions of the I. Corps of Infantry, arrived on the 21st at Amiens. In the course of the next few days other 6 battalions were brought up by the railroad which had just been re-established, as well as the detachment of General von Senden (which, as we have already seen, was replaced before Mezières by the 14th Division of Infantry), together with the Cavalry Division of Prince Albrecht Sohn. The Saxon Cavalry Division was advanced towards Ham, to protect the right flank of the First Army.

On the 21st the Commander-in-Chief determined to attack the enemy's position. The VIII. Corps was to pass the Somme and advance against the front and right wing of the enemy. The 1st Field Pioneer company received orders during the night of the 21st of December to establish two bridges for all arms across the Somme at Camons, about $3\frac{1}{2}$ miles above Amiens, and, as far as possible,

to use only materials obtained on the spot. One passage was established at Camons by restoring the iron lattice girder-bridge, which had been only partially demolished by the enemy. By this means communication was easily established before midnight over the river, which is here 22 metres wide and about 3 metres deep. A second passage was constructed at Neuville, where the enemy had more completely destroyed the bridge. Sixty metres length of bridge had to be built here, as the river was divided into several branches, and it was found absolutely necessary to use some of the equipment of the Light Field Bridge-train, on account of the very foul condition of the bed of the river. The work was completed by 4.30 A.M. On the morning of the 23d the company established a third crossing at Montier by means of the Pontoon-train. This bridge was fit for traffic at 1.30 A.M.

Before this the attack on the enemy's position had been begun, but although the 15th Infantry Division succeeded in taking the villages lying in the valley of the Hallue, the entrenched commanding position on the right bank of the stream remained in possession of the enemy. The 16th Infantry Division, which had been sent against the right wing of the enemy, succeeded also in driving them out of the valley of the Hallue, but failed in its attack on the heights and in an effort to outflank the enemy. At dusk the whole French line attempted an advance, but was driven back with the assistance of the battalions of the I. Corps, which had been held in reserve. Half of the 2d Field Pioneer company of the VIII. Corps, under the command of Lieutenant Pott, assisted the 29th Infantry brigade in taking the village of Querrieux by storm. The detachment cleared away all the barricades, and afterwards advanced against Pont Noyelles, but was brought back to Querrieux in the evening.

On the evening of the 23d the Commander-in-Chief directed that the villages in the valley of the Hallue, which had been taken by us, were to be entrenched, so as to be able to offer a strong resistance. It was early on the morning of the 24th when this order was received by the Pioneer companies. Lieutenant Pott and his detachment of the 2d Field Pioneer company fortified the villages of Daours and Bussy. The works of defence which were carried out during the day consisted of barricades across the roads, the destruction of some of the bridges over the Hallue, and the erection of barricades on others, loop-holeing the walls, and clearing the ground round the works. Similar works were carried out at the villages of Behencourt

and Beaucourt by detachments of the 3d Field company under Lieutenants Huene and Jordan. Besides this, additional bridges were built across the Hallue at different places. In many cases the men were exposed to fire while working.

On the 24th of December the two armies were again brought face to face in order of battle, and a fierce cannonade ensued. The enemy appears to have engaged in this duel of great guns to cover his retreat, which was begun during the afternoon. On the 25th a portion of the First Army followed the enemy along the right bank of the Hallue.

To improve the communication between the two banks of the Somme, three bridges (newly built or restored) were opened at Corbie by the 1st Field Pioneer company of the VIII. Corps, and on the 26th four passages across the river were established at Bray, Ham, and Feuillères.

The VIII. Corps pursued the enemy to within $4\frac{1}{2}$ miles of Arras, and then sent out flying columns in all directions. The enemy had taken up a strong position behind the Scarpe, his right flank resting on Arras, his left on Douai. This position, protected as it was by fortresses, was so strong as to be quite unassailable without far greater forces and means than were available.

One of these flying columns, under the command of Colonel Wittich, was accompanied by a detachment of the 3d Field Pioneer company of the VIII. Corps, under Lieutenant Jordan, which destroyed the railways and telegraphs in the neighbourhood of Arras. Similar duties were performed near Courcelles-le-Comte by another detachment of the same company, under First-Lieutenant Wagner. For want of larger game the latter detachment destroyed a small viaduct which rendered the railway useless for a certain time.

The object of the operations of the First Army was to get the entire command of the line of the Somme, and it became therefore necessary to obtain possession of the fortress of Peronne as soon as possible, since it commanded this line to a certain extent. Towards the end of December the state of affairs at Rouen becoming more critical, the greater part of the First Army had to be sent there. The duties of besieging Peronne and of covering the force carrying on the siege, were intrusted to the VIII. Corps, for which purpose the detachment of General von Senden and several Cavalry brigades were attached to it.

2. Bombardment of Peronne.

General Description of the Fortress.—The small town of Peronne on the Somme reckons about 4500 inhabitants. It lies at the point of intersection of the road between Arras and Ham and the direct road from Cambrai to Paris, 11 miles from Bapaume, 31 miles from Amiens, and the same distance from La Fère.

This fortress commands the swampy valley of the Somme, which is impassable for large masses of troops, and it is an important position for the defence of the line of the Somme, especially during wet seasons of the year. Moreover, lying within 11 miles of the railway between La Fère and Amiens, it was able to threaten this very important line of communication, so that its capture became a matter of urgent necessity. Near Peronne the Somme is only about 8 metres wide, and about from 1·5 to 2 metres deep. Its banks and bed are both very muddy. The ship canal of the Somme is much wider and deeper. The ground in the immediate vicinity of the fortress rises on both banks of the Somme to a height of 60 metres above the partially-inundated valley, and completely commands the fortress. The hills close on to the town almost up to the very walls.

The fortifications of the old town form a long quadrilateral figure, and consist of an old town-wall broken into bastions, behind which an earthen rampart had been thrown up. The old castle lies in the middle of the north-west front, and now acts as citadel. The wall and rampart form bastions round the castle, and the escarpments of the front and of the two small ravelins are revetted.

The fortifications of the east front form a nearly straight line, and are all without outworks. The suburb of Bretagne, which lies outside the small north-east front, is protected by a horn-work, which is not everywhere secure against a sudden attack. The gate of Bretagne leads through this enceinte. The ditches of the horn-work are throughout filled with water.

The small suburb, called the suburb of Paris, on the south side of Peronne, is protected by a horn-work, with wet-ditches. There are some hollow traverses in both its bastions.

Investment and Bombardment of Peronne.—The 3d Reserve Division, which was on the march to St. Quentin on the 24th of December, received on that day orders to cross over to the left

bank of the Somme, and to invest the fortress on its south side as soon as the enemy should have withdrawn, while the detachment under General von Mirus, consisting of 5 battalions, 4 squadrons, and 6 batteries, completed the investment on the north.

The Engineer and Artillery Staffs of the First Army were directed to reconnoitre the fortress, but as the investment was not complete before darkness set in on the 27th, the reconnaissance could not be commenced on that day; besides at 4 P.M. the village of Clery was still occupied by the enemy.

In spite of very thick weather, an attempt was made on the 28th to induce the town to capitulate by bombarding it with field-guns. With this view fire was opened against the town and works from 34 guns, which were placed in covered positions on each bank of the Somme, at distances averaging about 2000 paces from the fortifications.

The fortress held out and defended itself as well as its deficient equipment would allow. The guns of the fortress were almost all smooth-bores, but just before the investment two heavy naval guns had been brought in and placed in a covered position in the salient of the left bastion of the Couronne de Bretagne.

During the 29th of December ammunition began to grow scarce, and as it appeared absolutely necessary not to reduce too much the supply that might be required by the covering force, and as moreover there was no appearance or promise of a favourable result from the employment of field-guns alone, it was determined to establish a small siege park of French garrison guns taken at Amiens. As however most of these guns were unsuitable, 11 that were available of those taken at La Fère were intended to have been sent up. Great difficulty, however, was experienced in transporting these guns, and they only arrived toward the end of the siege.

After the fall of Mezières, 28 heavy garrison guns, which had formed part of the artillery park formed for the siege of that place, were ordered up to Peronne. Owing, however, to the defective railway communication, only two companies of Garrison Artillery were able to take part in the siege of Peronne.

After the departure of the troops of the I. Corps for Rouen, the 31st Infantry Brigade and the 3d Reserve Division were ordered to carry out the investment and bombardment of Peronne, while the rest of the VIII. Corps and the bulk of the 3d Saxon Cavalry

Division were to cover the besiegers against the French army of the North, and accordingly were pushed forward nearly as far as Bapaume.

The troops for the siege of Peronne were, in the beginning of January, placed under the command of Lieutenant-General Von Barnekow, and were made up as follows :—

- 12 battalions of Infantry.
- 8 squadrons.
- 9 field batteries.
- 2 companies of Pioneers belonging to Corps I. and III.

General Faidherbe, at once recognising, on the one hand, the importance of the fortress of Peronne, and on the other the weakness of the forces opposed to him, assumed the offensive in the beginning of the year 1872, and advanced with greatly superior forces against the detachments posted at Bapaume. Several battalions were therefore sent from the besieging force to reinforce the hardly pressed 15th Infantry Division.

In consequence of the alteration in the position taken up by the First Army after the battle of Bapaume, the troops carrying on the siege of Cambray had to provide for their own protection.

In the meantime Peronne had been completely invested, and at 10 A.M. on the 2d of January ten French siege-guns, which had been brought into position at Les Maisonettes on the left bank of the Somme, and 16 heavy field-guns on the right bank, opened fire against the fortress. But as there was as yet no certainty of a sufficient supply of ammunition being kept up, the bombardment could not be carried on with as much energy as was desirable, nevertheless a constant though slow fire was maintained during the following days, and a large part of the town was destroyed or rendered uninhabitable.

The Pioneer companies were immediately employed to restore the bridges which had been destroyed over the Somme canal at Brie, and in fortifying Cartigny, Le Mesnil, Brie, and other villages. At the same time a detachment of the 3d Pioneer company, under Lieutenant Jordan, was directed to break up the railroad between St. Quentin and Cambray. Covered by a squadron of Hussars, the detachment carried out this duty during the night between the 6th and 7th of January by blowing up an arched viaduct, having a span of 8 metres. Two charges of $\frac{1}{2}$ cwt. of powder were used, and the

demolition was perfect. On the 7th of January the viaduct at Essigny, which had been partly demolished by the Germans, and had been since then restored by the enemy, was also completely destroyed by one charge of powder.

As the fortress showed no signs of capitulating, several Engineer officers were directed to make a special reconnaissance of the fortifications, and to report whether it would be possible to carry the place by storm. On the evening of the 6th of January Captains Pagenstecher and Kluge, and Lieutenants Wagner and Gerhardt, reconnoitred the fortress and penetrated in places as far forward as the glacis. These officers reported unanimously that the outpost-duty of the fortress appeared well carried out. The suburbs were occupied strongly, and their defences had been lately much improved, especially those of the village of Flamicourt, which lay in front of the weak south-east face of the fortress.

All the same, this front was still the best place to attack, as its wet ditches were frozen. There were, however, places in them clear of ice, but whether produced by the existence of warm springs in the ditches, or by artificial means, could not be ascertained. The Engineer officers reported, therefore, against the advisability of attempting an assault at once, as a surprise was hopeless, and recommended to postpone it till the arrival of the siege guns then on the road, when the imperfectly covered walls of the east front could be breached. It was certain that the heavy frost, which had in the meantime set in, would render the passage of the ditches easy enough.

The Commander of the Division approved the report, and the assault was postponed for the present.

The siege batteries continued to fire slowly, so as to make sure that the ammunition would not fail before the arrival of a fresh supply.

Provision was made, however, to increase the fire on the 9th of January. On the morning of that day the fortress was summoned to surrender, and negotiations were concluded by the evening.

On the 10th of January the fortress was given up, together with 3000 men, and 47 guns, and a large quantity of war *materiel*, the powder-magazines having first been carefully examined by the 3d Field Pioneer company. The Division had feared that the capitulation would not be observed, as General Faidherbe had been for some days hurrying up to relieve Peronne, and had advanced on the roads from Lille and Bapaume to within $6\frac{1}{2}$ miles of the fortress.

Captain Kluge undertook the duties of Fort Engineer. It was of the utmost importance to place the fortress as speedily as possible in a condition of defence.

The ground round the fortress was first cleared by the 3d Field Pioneer company, assisted by working parties of Infantry. The ditches were cleared of ice and kept clear, the sallyports in the glacis barricaded, and the drawbridges and gates which had been demolished were restored. All delay was dangerous, as the enemy had advanced again to within 4½ miles of the fortress.

The arming was therefore carried out as quickly as possible. Blindages were constructed, wire entanglements spread on the glacis, by using the stumps of the trees which had been left standing above ground, and palisades were placed in the unrevetted ditches. By the end of January the fortress was in a good defensible condition, and perfectly secure against a sudden attack.

3. *Battle of Bapaume.*

When we last saw the 15th Infantry Division in the beginning of January, it had just taken up a position at Bapaume to cover the siege of Peronne.

On the 2d of January the French Army of the North assumed the offensive, and forced the 15th Division to evacuate some of the villages lying to the north and west of Bapaume, and to take up a concentrated position in front of that place. The detachments under Prince Albert's son and the 3d Cavalry Division received orders to operate on the left flank and rear of the enemy as soon as he should attack Bapaume.

At 9 A.M., on the 3d of January, the enemy advanced against our position, and a hard struggle ensued round the villages of Biefvillers and Favreuil. These villages were evacuated about mid-day, when the town of Bapaume at once became the principal point of the position, and the scene of the hardest fighting, which lasted till the evening, when the enemy gave up the attack, after having, however, obtained a firm hold of the ground close in front of the town, which had not been prepared for defence.

At the suggestion of the officer commanding it, the 2d Field Pioneer company, which was attached to the 30th Infantry brigade, and had taken part in the fight for the village of Sapigny on the

previous day, received orders at 10 A.M., on the 3d of January, to go to Bapaume, and to endeavour as far as possible to prepare the main street for defence. Accordingly, several houses were loopholed, particularly those near the market-place, the windows were stuffed with mattresses and beds, and the outlet of the street was barricaded. The streets leading into the market-place were also closed by defensible barricades. At 4.30 P.M. the company made a portion of the suburb south of Bapaume defensible, and at 6 P.M. the western points of exit from the town were closed in the usual manner by the construction of four barricades, and the works of defence begun by the Infantry were improved. At 9 P.M. all these works were completed, and the company took up alarm-quarters in Bapaume.

As artillery ammunition was short, enormous losses must have occurred in an attempt to hold the town against often repeated attacks by the far superior numbers of the enemy, and as the principal duty of the troops concentrated there was not to defend Bapaume, but to cover the siege of Peronne, the main body of the army was withdrawn in the direction of that town on the 4th of January, and only a small force was left behind. Quite unexpectedly, however, the French Army of the North retired on the same day in the direction of Arras.

On the 6th of January the 15th Division and the 3d Reserve Division took up new positions at Albert and Combles, from whence the enemy could be taken in flank and rear if he again attempted to advance on Peronne. To provide for the security of the army in case it should have to retire to the left bank of the Somme, the General Officer commanding the VIII. Corps ordered preparations to be made to blow up all the bridges across that river between Amiens and Peronne.

When on the 9th of January the enemy advanced against Peronne, the 2d Field Pioneer company, under the command of First-Lieutenant von Goessel, which had been employed according to the above order, received further directions to complete the destruction of all the bridges between Bray and Becquemont.

4. *Defences of the line of the Somme, and final operations of the First Army.*

After the capitulation of Peronne, the position of the VIII. Corps was again changed, the main body being on the left bank of the Somme and the right bank being merely kept here and there under observation.

The principal points were to take full advantage of the good front defence afforded by the river, and to fortify the few bridges which it was necessary to maintain for communication across it. The very hard frost which had hitherto prevailed had, without question, reduced the tactical value of the Somme as a defensive obstacle, as the swampy lowlands on its banks became passable even for heavy waggons. On the ship canal the ice had formed sufficiently to be passable for men at several places ; but, on the other hand, there was no sign of ice forming in the main stream of the Somme.

The demolition of the bridges between Peronne and Amiens, which had been begun, was therefore completed, and beside the two railway bridges at Becquemont and Lamotte, the bridges at Cappy, Bray, Corbie, and Camons were the only ones maintained ; either kept intact or restored, as the case might be. These were all secured against attack as far as possible by bridge-heads. These works were carried out by all the Pioneer companies of the VIII. Corps, under the direction of the Engineer Staff of the Corps. Several crossings were also restored between Peronne and Ham, particularly at Brie, Voyennes, and Epenancourt.

The town of Ham and its fortified castle were of great importance for the protection of the line of the Etappen communication by rail between La Fère and Peronne ; the defences of the castle were therefore strengthened in the beginning of January. For this purpose a detachment of the 3d Field Pioneer company of the VIII. Corps, under Lieutenant von Huene, was sent to Ham on the 5th of January, and the town occupied by a battalion of Infantry on the evening of the same day.

The castle of Ham lies at the southern extremity of the town, from which it is separated by an esplanade 400 paces wide. On its southern and western sides it is surrounded by the Somme canal. The castle occupies a rectangle about 105 metres long

and 75 metres wide, flanked by towers, and is of small strength. Cuts were made across the embankments leading to the castle and bridges, easily removable, placed to cross them. Scaffolding was erected behind the breastworks, which had hitherto only offered a passive defence, so as to enable them to bring a grazing fire to bear on the esplanade, for which purpose only the towers and the curtains between them had as yet been available. Defences were also erected to protect the three entrances to the town, viz., the road over the Somme bridge to St. Quentin, and the roads leading across the Somme canal-bridges to Amiens and La Fère. The outskirts of the town near these places were also fortified, and finally the ice on the canal, which would have facilitated an attack on the town from the south, was broken up daily by opening and shutting the locks. After the 10th of January, on which day these works were finished, the castle could fairly be reckoned a strong post, defensible by a small body of troops.

Several bridges across the Somme between Ham and La Fère were restored, notably those at St. Simon and Jussy; so that along the line of the Somme between Amiens and La Fère there were four bridges protected by permanent works, besides a great number secured against any sudden attack by field fortifications, and all of these bridges were capable of being destroyed in a short time.

The small number of Pioneers, only 5 companies, available for all the works on the Somme between La Fère and Amiens, and for carrying on simultaneously the fortifications at the fortresses and citadels of both Amiens and La Fère, as well as the preparations for the siege of Peronne, obviously prevented the execution of larger defensive works, which would otherwise in all probability have been erected. It would, for instance, have been better had the work of strengthening the castle of Ham, and of arming it with a few captured French guns or mitrailleuses, been taken in hand earlier, as it was much needed for the protection of the often threatened line of Etappen communication.

Some days after the battle of Bapaume the First Army took up a position on the Somme between Peronne and Amiens. The Cavalry was pushed forward as far as St. Quentin and Bapaume.

After the 11th of January, when the enemy again advanced, the advanced troops were withdrawn, and at the same time several passages across the Somme were destroyed, as has already been mentioned. The Commander-in-Chief thought of accepting battle

near Amiens, towards which point considerable reinforcements were being sent up from Rouen.

Hearing of these reinforcements, the French Army of the North advanced on the 16th of January towards St. Quentin, in order to gain the direct road to Paris, and thus make a last attempt to relieve the sorely pressed capital.

General von Groeben hastened to St. Quentin with his army, which had been reinforced from Rouen, and on the evening of the 18th of January concentrated 9 miles south-west of that town, opposite to the French army of 40,000 men.

On the 19th of January the First Army, reinforced by the Saxon Division of Cavalry, attacked the French Army of the North in front and flank, and, after desperate fighting, completely overthrew it, as is well known.

The defeated enemy were pursued on the day following up to the walls of Cambrai. The 1st Field Pioneer company of the VIII. Corps, taking advantage of this opportunity, blew up two railway viaducts, one at the junction of the lines from Cambrai to Le Château, and to St. Quentin, and the other at Bevin on the following day.

On the 22d of January the fortress of Cambrai was summoned to surrender, but refused. On the following day the Saxon Cavalry Division attempted to obtain possession of the small fortress of Landrecis by bombarding it with two field-batteries, but in vain.

No further operations were attempted against the northern fortresses of France, as it was deemed necessary to withdraw the main body of the army behind the line of the Somme, to avoid having to split it up into detachments, and also because, at the time, there was no siege-train available.

At the time immediately preceding the armistice the army was distributed as follows :—

The I. Corps had been replaced on the left bank of the Seine by the XIII. Corps, and about one Division was posted on the right bank.

The 15th Division had occupied Amiens, and had thrown large detachments to the front as far as the line from Acheux to Bapaume. Communications with Rouen were maintained by detachments, who, at the same time, protected both sides of the Somme, and patrolled as far as Abbeville.

The 16th Infantry Division was distributed on the left bank of

the Somme, occupied the fortified passage over that river at Cappy, and detached troops to Bapaume. This Division protected the bridges at Bray, Neuville, and Feuillères, which had been prepared for demolition.

The Division of the 1. Corps was pushed forward to Roissel, eastward of Peronne, and observed the roads to Bapaume, Arras, and Cambrai. The Saxon Cavalry Division and three Infantry battalions attached to it, were stationed in and near St. Quentin, and pushed forward detachments against Cambrai, Valenciennes, Le Quesnoy, and Landrecis. Finally, the 3d Cavalry Division and the 3d Reserve Division were distributed on the left bank of the Somme. The armistice followed on the 31st of January, and the arrangements for the complete defence of the Somme were left unfinished.

FINAL REMARKS.

From an Engineer point of view the operations of the First Army in the north-west of France are full of interest.

The course of events showed plainly that even small fortresses have great strategic influence, as it was the large number of them, dotted over the field of operations, which alone enabled the French army, so hastily assembled and badly disciplined, to make so good a defence. The fact that the small fortresses, which have been specially mentioned in these pages, had been completely and unaccountably neglected, and left in a state which rendered them powerless against modern arms, was of unspeakable injury to the French cause.

Had there been fewer of these fortresses, and had these few been maintained in as good order as even those German fortresses, which, for many reasons, cannot be strengthened in proportion to the rapid progress in modern artillery, there can be no doubt but that the position of the First Army during December and January would have been very critical, if not wholly untenable.

This campaign shows also the high importance of field-works in the warfare of the present time.

The French positions before Amiens and Havre, and on the Hallue, and the German positions at Rouen and on the Somme, had great influence on the operations of both armies.

The unfavourable season, the great want of specially trained men, and the disinclination still felt in the German army to the use of the pick and shovel, all operated in preventing a much more frequent recourse to artificial means of defence.

Finally, the numerous demolitions and restorations of bridges and railway communications are of great interest, and show the necessity of *having each unit of the technically trained troops as mobile as possible, and of having a perfect equipment for them.*

It will not be till then that the Cavalry will be able to carry out properly what is one of their most important duties, *that of breaking up the communications in rear of the enemy*, for it must never be forgotten that a hurried or incomplete demolition is often worse than useless. Commanding officers may be misled by news of such demolitions into a belief that certain railways have become altogether useless to the enemy, when perhaps only a few hours' work are required to restore the imperfectly demolished bridges and railways to working order.

APPENDIX.

SUMMARY of the various Detachments and Bodies of Technical Troops embodied during the Campaign of 1870-1871, exclusive of Reserves.

I. KINGDOM OF PRUSSIA.

(1.) 36 Field Pioneer companies, each consisting of	5 officers. 1 medical officer. 212 men (including soldiers of the train). 17 horses. 3 waggons (1 officer's equipment waggon, 1 tool waggon, and 1 powder waggon).
(2.) 33 Garrison Pioneer companies, having each	4 officers. 1 medical officer. 200 men. (<i>N.B.</i> —30 of these companies were mobilized and provided with the same equipment in horses and waggons as the Field Pioneer companies.)
(3.) 12 complete Pontoon columns (not attached to companies), having each	2 Engineer officers. 63 pioneers. } Attached. 3 train officers. 1 medical officer. 1 paymaster. } In charge. 158 men. 277 horses. 41 waggons, with materials for not more than 160 metres of bridge.
(4.) 12 Light Field Bridge-trains. (Each attached to one of the Field Pioneer companies of an Army Corps.)	2 train officers. 51 men. 87 horses. 13 waggons, with materials for about 58 metres of bridge.
(5.) 12 entrenching columns. (Each attached to one of the Field companies of an Army Corps.)	18 men. 30 horses. 6 waggons (laden with 1200 spades, 300 pickaxes, 180 axes, etc.)

Telegraph Detachment.

(6.) 7 Field Telegraph detachments, having each

3	Engineer officers.
1	medical officer.
1	field telegraph inspector.
6	field telegraph clerks.
101 pioneers.	

Telegraph Train.

1	train officer.
34	men.
82	horses.
12	waggons.

Telegraph Detachment.

(7.) 5 Etappen Telegraph detachments, having each

(Each divided into two sections, viz.—
1st section for new work ; 2d section for reconstruction.)

1	Engineer officer.
2	telegraph inspectors.
10	clerks.
41	pioneers and soldiers of the train.
24	telegraph workmen.

Telegraph Train.

1	train officer.
46	men.
139	horses.
16	waggons.

Railway Company.

(8.) 5 Field Railway detachments, having each

3	infantry officers.
1	Engineer officer.
186	men (including 75 pioneers)
16	horses.
2	waggons.

Technical Railway Staff.

1	principal officer.
19	officials.
24	foremen.
Corps of labourers varying in number.	

(9.) Torpedo detachments.	(a) Not mobilized, each having	5 Engineer and naval officers. 80 pioneers. 10 sailors. Working parties supplied by the Garrison Pioneer companies and the Navy.
	(b) Mobilized, each having	2 Engineer officers. 1 medical officer. 55 pioneers. 27 sailors. 5 horses. 1 waggon.
(10.) Balloon detachment—		{ 2 Engineer officers. 42 pioneers.
(11.) Field Photographic detachment—		{ 2 Engineer officers. 11 pioneers.

II. KINGDOM OF BAVARIA.

(1.) 2 Field Engineer Divisions, having each	Staff, 3 Field Engineer companies and 1 Field Telegraph detachment, containing altogether— 18 officers. 1 medical officer. 703 men, including drivers. 346 horses.
	46 waggons (including 2 bridge equipments of 15 waggons each, 2 pioneer equipments of 4 waggons each, 1 telegraph equipment of 3 waggons). <i>N.B.</i> —In September 1870 1 bridge equipment of 15 waggons was added to each Field Engineer Division.
(2.) 1 Garrison Engineer Division, consisting of	Staff and 2 Garrison Engineer companies, containing altogether— 12 officers. 1 medical officer. 476 men, including drivers. 155 horses.
	20 waggons (including 2 Pioneer equipments of 4 waggons each, 2 Sapper and Miner equipments, and 2 Field Smithies, having together 6 waggons).

(3.) 1 Garrison Engineer company.	{ 4 officers. 194 men. 3 horses. 1 waggon.
(4.) 1 Etappen Engineer company.	{ 5 officers. 167 men. 52 horses. 5 waggons (including 1 Pioneer equipment)
(5.) 1 Etappen Telegraph detachment.	{ 2 officers. 62 men. 12 horses. 2 waggons.

Railway Company.

(6.) 1 Railway detachment.	{ 4 Engineer officers. 181 men. 60 horses. 1 railway equipment.
	<i>Technical Railway Staff.</i> 1 director. 17 officers and station-masters. 20 foremen.

III. KINGDOM OF SAXONY.

(1.) 3 Field Pioneer companies. (2.) 1 Pontoon column. (3.) 1 Light Field Bridge-train. (4.) 1 Entrenching column.	{ Organized like the Prussian.
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IV. KINGDOM OF WURTEMBURG.

(1.) 1 Pioneer Corps (1 Pioneer company and 1 Sapper company, with bridge-train and entrenching column.)	{ Staff and 2 companies, together— 12 officers. 415 men. 170 horses. 31 waggons.
(2.) Field Telegraph detachment. (Attached to the Pioneer Corps.)	{ 2 officers. 1 telegraph inspector. 6 telegraphists. 40 men (including train soldiers). 31 horses. 5 waggons.

Summary of Technical Troops embodied during 1870-71. 249

(3.) Garrison Engineer company. { 5 officers.
165 men.
8 horses.
1 waggon.

V. GRAND-DUCHY OF BADEN.

(1.) 1 Field Pioneer (Pontoon company).
(2.) $\frac{1}{2}$ Pontoon column.
(3.) 1 Light Field Bridge-train.
(4.) 2ds of an Entrenching-column.
(5.) 1 Garrison Pioneer company. } Organized in general like
the Prussian.

VI. GRAND-DUCHY OF HESSE.

1 Pioneer company (with
Light Field Bridge-
train). { 5 officers.
1 medical officer.
211 men.
167 horses.
18 waggons (including 12 bridge-train
waggons).

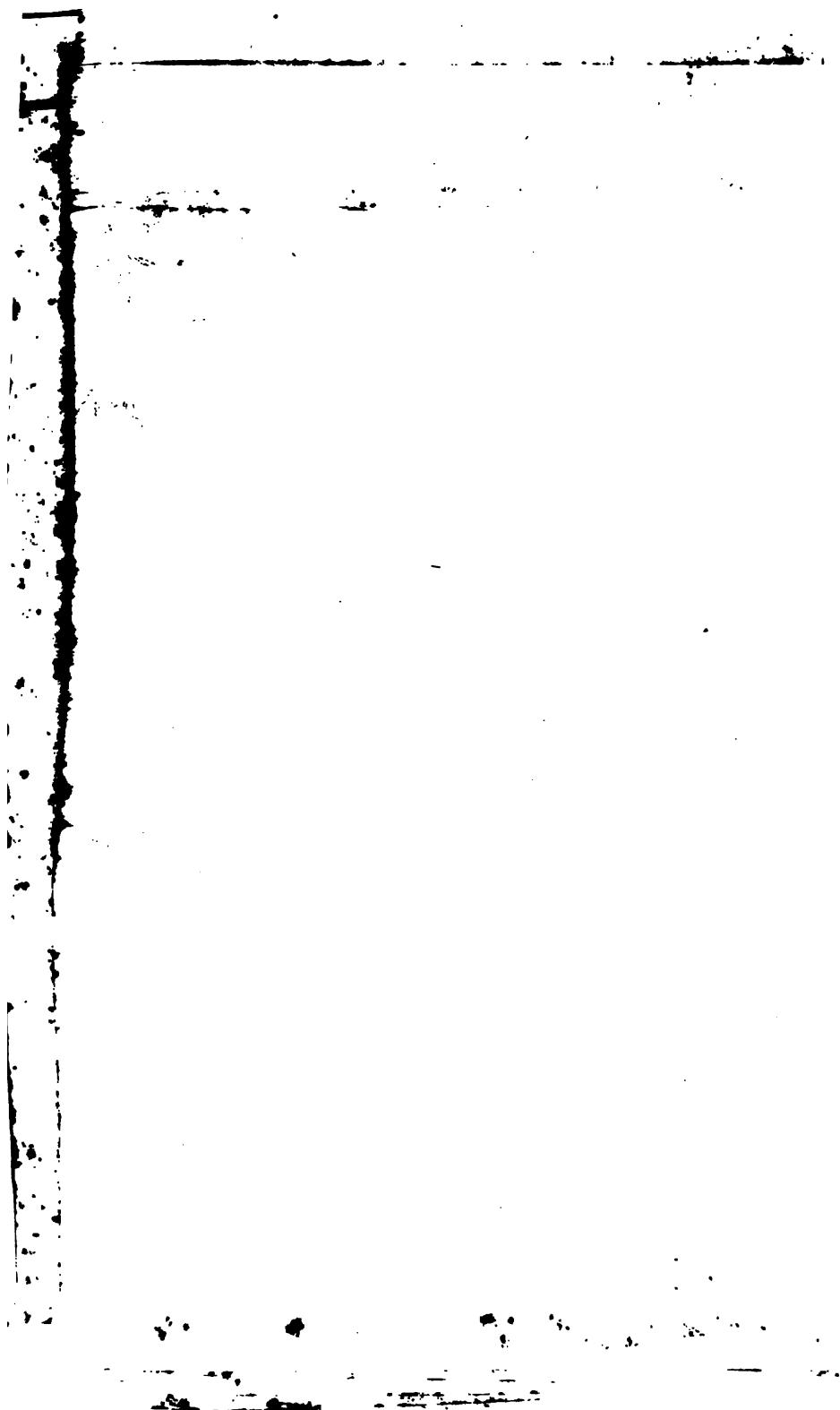
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PLATE I.







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PLATE II.





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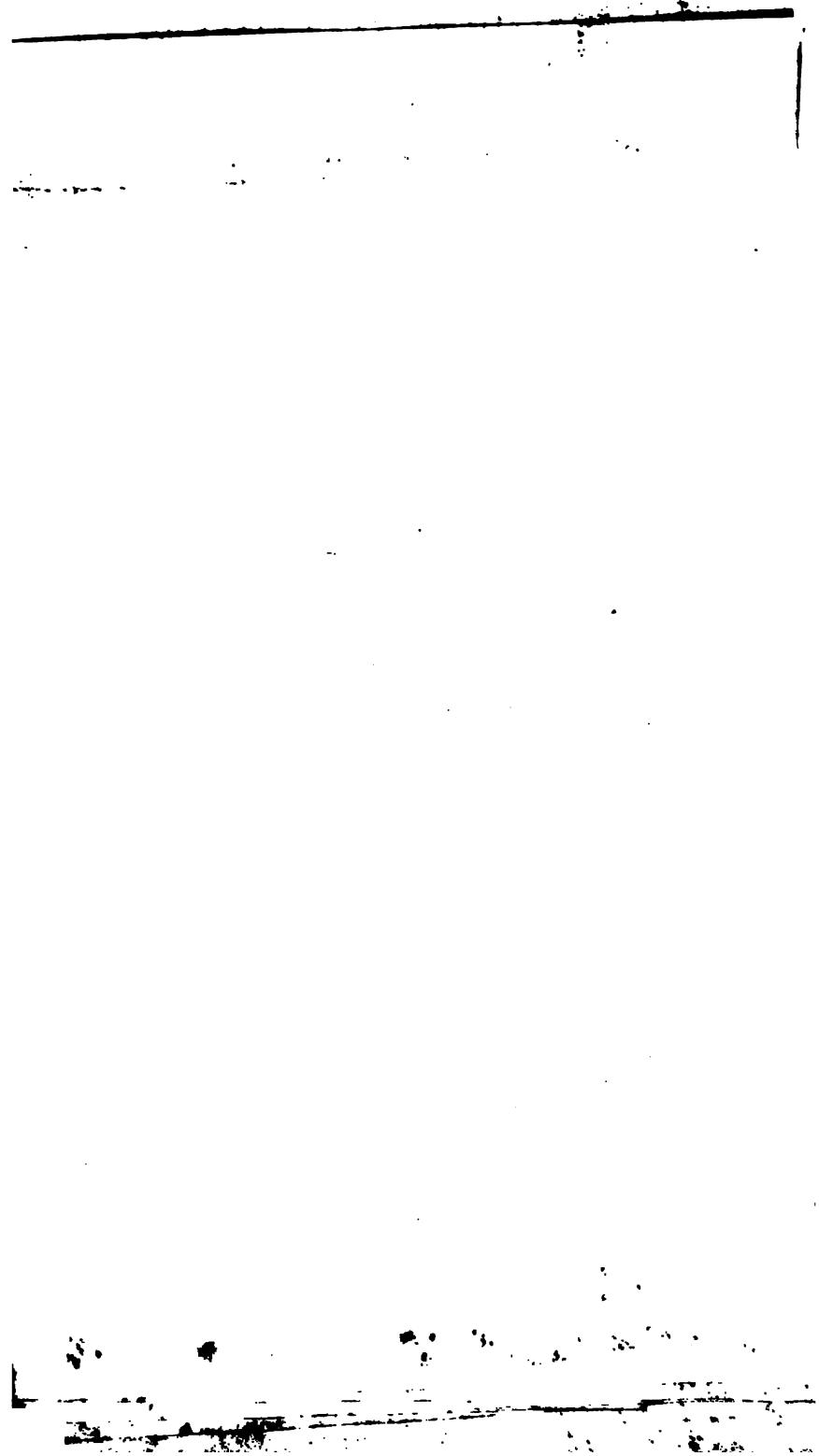
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PLATE I

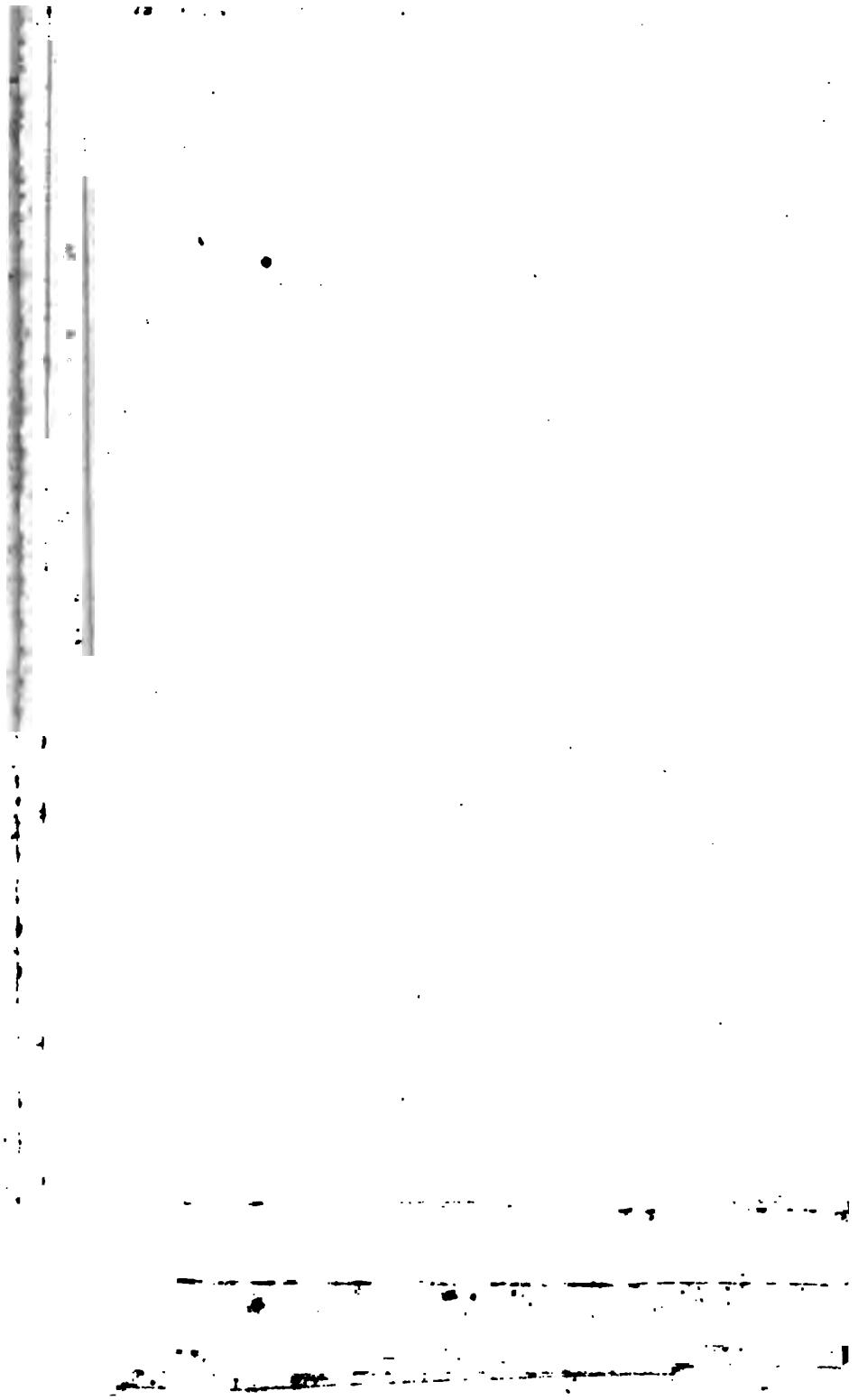




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PLATE II.







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